THE IRON TRADE REVIEW

Volume XLI CLEVELAND, OCTOBER 3, 1907 Number 14

SLOWING DOWN

FOR DULL PERIOD IN THE IRON TRADE.

But Business is Fair and No One is Alarmed—Some Concessions, but no General Decline in Prices.

Slowly and without any approach to a panicky feeling, the iron trade is adjusting itself for a comparatively dull period, and in the fact that this rational preparation is proceeding lies the hope that there will not be serious depression in business. Buying by some interests is undeniably light, and it is probable that orders placed by railroads will decrease as the diminished tonnage of iron and steel products to be hauled releases rolling stock and decreases the demand for new cars. It is expected, however, that large orders for steel rails will be placed after the new rail specifications are agreed upon by the joint committee which has been considering them for some time. Conditions in this country are reflected in England and there seems to be a world-wide tendency toward decreased activity in the iron and steel business. Export business is, however, showing indications of improvement. An inquiry is pending for 20,000 tons of rails for Turkey with the prospect that bridge material will be shipped to Chili, China and Japan.

Decreasing Production

Increasing willingness of manufacturers to close plants for needed repairs is shown in many instances, notably in the announcement that the Bessemer converters at the Homestead plant of the Carnegie Steel Co. will be shut down for a 30-day period and will ultimately be replaced by open-hearth furnaces, as will also at a more distant time the Bessemer converters at the Duquesne and Edgar Thomson plants.

Pig Iron Very Quiet

The pig iron market continues very quiet with sales limited almost entirely to small lots. There are, however, some inquiries for round tonnages of basic both in the Pittsburg and New York districts, and consumers are finding difficulty in placing their orders. Prices of steel making iron in the central west are very firm and the supply limited. In foundry grades, little business is being transacted and prices show slight irregularity, but are pretty well maintained, especially in the south. Some eastern furnaces are finding that selling prices are approaching dangerously near the cost line and contemplate blowing out unless conditions improve.

Structural Material

Orders for structural material last month amounted to more than 120,000 tons, of which only about one-fourth went to the principal producer. Business consisted to a large extent of small contracts, and competition was active.

Still Some Price Cutting

While here and there reports are heard of the cutting of prices, especially on sheets, shafting and spikes, the tone of the finished material market is slightly improved. The demand for merchant bars is very fair, one independent mill having received orders for 15,000 tons of steel bars, but the bar iron market is not very strong. Orders for plates for three lake vesesls have been placed and the plate business is in good condition, although premiums have practically disappeared. One municipal order for 2,500 tons of cast iron pipe has been placed, and it is expected that considerable new business will be taken at a not far distant date. The year's business in cotton ties, which has been very satisfactory this year, is near its end. Semi-finished steel is being more freely offered. Prices are slightly lower on billets, but sheet bars are still very scarce.

RATHER GLOOMY

ARE REPORTS OF BRITISH IRON TRADE.

Greatest Anxiety About Steel—Labor Troubles a Factor—Purchase of American Horse Shoes Causes Agitation.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Sept. 21.

There is more nervousness about the condition of trade just now than at any time this year, and many gloomy prophets quite confidently assert that the high-water mark of the iron trade has been touched. This opinion hardly finds justification, inasmuch as nearly everybody is full of work. But it is still true that the pace has gone, as far as new orders are concerned. Everybody is disposed to await the course of events. The greatest anxiety exists about steel. Apparently, foreign quotations are the disturbing element. Both Germans and Belgians are quoting below British prices and it is said that for billets, for which the British quotation is £5 17s 6d, Germans and Belgians are ready to accept £5 12s 6d. It seems clear that production has overtaken demand. It is true that nobody seems to have seen any steel from either of the European countries mentioned, but the note of alarm has already dropped quotations. The British houses express their determination to keep out foreign steel, even if they have to make substantial reductions. They can well afford to do this, after the handsome prices they have been realizing for some time. Consumers who use billets and tin bars would welcome foreign competition, as it would increase their own margin of profit for finished goods. Most makers of finished iron are very well off for work, and some bar houses are busy. A fine trade is being done in railway fittings, such as nuts, bolts, spikes, etc., and the wagon builders have plenty of work. The principal effect of the uneasiness is that transactions are purely for immediate requirements, most people deliberately de-

(Continued on page 529.)

THE WEEK IN IRON CENTERS

PITTSBURG.

Homestead Bessemer Plant Will Be Closed for Repairs—Orders Decreasing.

Office of THE IRON TRADE REVIEW,
521 Park Bldg., Oct. 1.

The local iron and steel market is in pretty good shape, all things considered. Total obligations on the books of the big producers are decreasing from week to week, but they are working around to readjust themselves to the new conditions. The situation is being taken philosophically and there are no indications of what, with the greatest stretch of imagination, could be construed as a panicky feeling.

Prices are, as a general proposition, being well maintained all along the line and advantage of the lull is being taken in many branches of the business to make much needed repairs after the long run at high pressure. The two 10-ton Bessemer converters at the Homestead plant of the Carnegie Steel Co. will be shut down for a 30-day period for repairs and they will probably be abandoned at some future time, to be replaced as far as the steel supply is concerned by the open-hearth department, ten 50-ton furnaces being in operation at No. 4 plant at Homestead, and six more will be ready shortly after the first of the year. The Bessemer plant of the Carnegie Steel Co. at Duquesne is expected to be ultimately displaced by open-hearths. A similar move is contemplated for the Edgar Thomson plant, but no date has been fixed, and none will be as long as the demand for the Bessemer output of this plant is maintained at the present pace. Bessemer steel has lost its popularity and the big interests in and about Pittsburg are gradually changing their equipments to meet the demand for open-hearth steel.

To the fact that the railroads are doing very little buying is attributed the lack of interest at this time in new buying except for immediate requirements on the part of those interests which have not already covered. The pig iron market is without feature and aside from a few scattered lots involving small tonnages there has been no movement of note.

Pig Iron.—A large interest in the central west during the past week was in the market with an inquiry for 2,250 tons of basic pig iron, 250 tons for spot shipment and 2,000 tons for October and November, but valley furnaces are so far sold up that no quotations were made on the inquiry in this district. The Jones & Laughlin Steel Co. has had an inquiry out for Bessemer pig iron, but could not secure it for October or November. Pig iron prices are nominal at best, as there have been no transactions upon which to base a market quotation. There is a surprisingly small amount of pig iron of any grade being offered, and the assertion has been made by the two leading independent producers that it would be impossible to get Bessemer for delivery over the next two months. With this situation, one lot of a fair tonnage is offered from the Cincinnati territory, but is being held at considerably above the present nominal market. There is practically no inquiry for foundry iron and valley furnaces are holding at $21 to $21.50 furnace, and some are asking $22. There was more business transacted during the midsummer vacation period than at the present time. In only one instance has it been discovered that furnaces are able to accumulate a stock. Consumption of pig iron is being maintained and consumers are urging shipment on their contract iron. An offer of $19 furnace for a fair tonnage of gray forge iron was refused by the furnace to which it was made. Absolutely no interest is being displayed in pig iron for delivery beyond the first of the year, either on foundry grades or steel making iron. For delivery over the remainder of the year we quote the following nominal market:

Bessemer, Valley	**$22.00 to 22.25**
Bessemer, Pittsburg	**22.90 to 23.15**
No. 1 Foundry, Pittsburg	22.40 to 22.90
No. 2 Foundry, Pittsburg	21.90 to 22.40
Gray Forge, Pittsburg	20.40 to 20.90
Basic, Valley	**20.50 to 21.00**
Basic, Pittsburg	**21.40 to 21.90**

Ferro-Manganese.—The inactivity of the past two months is still very much in evidence and while considerable ferro is being offered in the market, but few sales are being made. In carload lots for prompt shipment, we quote ferro-manganese, foreign 80 per cent, at $59 to $60 Pittsburg and on forward deliveries $57 to $58.

Imported 50 per cent ferro-silicon is quoted $100 to $102 Pittsburg, for prompt at $97 to $98 on forward deliveries, domestic 12 per cent, $36; 11 per cent, $35; 10 per cent, $34. The lower grades of imported ferro-silicon are quoted 50 cents lower. These quotations are applicable to Pittsburg territory. Western and central western prices, where the material is not subject to the competition of foreign grades, are higher, and in the east a little lower.

Plates.—There is a fair demand for wide plates and a continued good demand for universals, both of these on old contracts, there being comparatively little new business being placed with the mills at this time. The American Ship Building Co. during the week closed with the leading interest for 3,600 tons of plates and shapes for a new lake vessel. The total obligations on the books of manufacturers are decreasing, and mills are working round to readjust themselves to meet the new conditions. Fabricating companies are taking out their contracts on old work in good shape, but on account of the quiet condition of the building trades, are replacing very little new business. Miscellaneous small business is in some instances commanding slight premiums, but on desirable business the official 1.70c base Pittsburg price is being quoted. We continue to quote:

Tank plate, ¼-inch thick, 6¼ to 100 inches, 1.70c f. o. b. mill Pittsburg. Extras are as follows per 100 pounds: Boiler and flange steel plates 0.10c. A. B. M. A. and ordinary firebox steel plates, 0.20c still bottom steel, 0.30c marine steel, 0.40c locomotive firebox steel, 0.50 all sketches, excepting straight taper plates varying not more than four inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c; Plates in width over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1.00c. Gages under ¼-inch to and including 3-16-inch plate on thin edges, 0.10c; under 3-16 to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—The new sheet business has improved. Specifications are good and the whole tone of the market is better. Some little cutting is reported on painted roofing and flat sheets, but none at all on galvanized

or blue annealed. The delivery promises of the leading interest on galvanized blue annealed is now 15 to 16 weeks, but on light black sheets and the light gages and small sizes of blue annealed, about six weeks. We quote as follows:

Black steel sheets, one pass, cold rolled, Nos. 11-12, 2.20c; Nos. 13-14, 2.25c; Nos. 15-16, 2.30c; Nos. 17-21, 2.35c; Nos. 22-24, 2.40c; Nos. 25-26, 2.45c; No. 27, 2.50c; No. 28, 2.60c; No. 29, 2.75c; No. 30, 2.85c; galvanized Nos. 10-11, 2.65c; Nos. 12-14, 2.75c; Nos. 15-16, 2.85c; Nos. 17-21, 3.00c; Nos. 22-24, 3.15c; Nos. 25-26, 3.35c; No. 27, 3.55c; No. 28, 3.75c; No. 29, 4.00c; No. 30, 4.25c; blue annealed, No. 10 and heavier, 1.85c; Nos. 11-12, 1.90c; Nos. 13-14, 1.95c; Nos. 15-16, 2.05c. Corrugated roofing, $1.90 per square for No. 28 painted, 2½-inch corrugation, and galvanized, $3.25 per square for No. 28.

Tin Plate.—A substantial tonnage of new tin plate business for the first quarter of next year has been placed during the past week with the leading interest, at the current price of $3.90 base. There has been some tin plate business held up, buyers not having begun their mill specifications, but this tonnage is comparatively small. Several of the independent manufacturers whose order books are running light are shutting down part of their equipment rather than cut prices with the present price of semi-finished material or run on stocks. We quote:

Coke tin plate 100-pound basis, 14 x 20, $3.90 f. o. b. mill, Pittsburg district. Terms, 30 days, less 2 per cent for cash in 10 days.

Rails and Track Material.—The rail situation is still hanging in the balance pending the report of the joint committee now in session in New York. This report will probably be made public during the latter part of the present week, and be immediately followed by heavy reservations for 1908 capacity. During the past week, rail sales in this district were very light, amounting only to about 2,000 tons of standards and less than 1,000 tons of light rails. The inquiry during the past week, upon which no business was done, amounted to 47,000 tons of standards and 2,300 tons of light rails. Continued shading is reported on re-roll rails. On the 1907 specifications we quote as follows:

Fifty-pound and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; 8-pound, $40; 12-pound, $36 to $37; 16-pound, $35 to $36; 20-pound, $34 to $35; 25 to 45-pound, $33 to $34; angle splice bars for standard sections, $1.65; standard spikes $2.15 to $2.20 Pittsburg; hand spikes $2.40 to $2.50 Pittsburg.

Steel.—The supply of semi-finished steel, billets and slabs is easier both in the tonnages being offered in the market and in price. During the past week, Bessemer billets have been offered at $28.50 Pittsburg and open-hearth $31.50. Sheet bars are still very scarce at $31 Pittsburg. Several of the independent sheet and tin plate interests have been off two to three days per week on account of shortage in their steel supply. The biggest change in conection with semi-finished steel will come with the shutting down of the two 10-ton Bessemer converters at the Homestead plant of the Carnegie Steel Co. which will lessen the supply about 1,000 tons per day. While this plant will not be dismantled immediately, indications are that it will in time make way for open-hearths. The 10 50-ton open-hearths at the No. 4 plant of Carnegie Steel Co. which went in last August, and the six new 50-ton open-hearths which will be ready before the first of the year will take the place of the Bessemers. Early in the present year, the Carnegie Steel Co. announced that the Bessemer converters at the Duquesne plant would be abandoned and replaced by open-hearths. A similar change will eventually be made at the Edgar Thomson's, but no dates have been fixed. With the heavy demand for Bessemer output of Edgar Thomson, it is not likely that it will be shut down for the change until the leading interest experiences difficulty in selling the product and this, from present indications, will not be soon. New and heavier mills are now being built for the Edgar Thomson rail mill, but details have not been made public.

Hoops, Bands and Cotton Ties.—Specifications against hoop and band contracts are about equal to mill shipments and the market is in good shape. The tail-end of the cotton ties business is being wound up and reports are that the crop is but a trifle below that of last year. Prices are unchanged and we quote as follows:

Hoops in carload lots, 2c; in less than carload lots, 2.10c; bands, 1.60c; base half extras as per standard steel; cotton ties, 97c per bundle.

Merchant Bars.—Specifications against steel bar contracts are well in line with those of the past few weeks, those of the week under review showing a slight increase over those of the previous week. No new business of importance has been taken on by producers of steel bars. The iron bar business has improved both in tone and price, and as far as can be learned no concessions are being made on the 1.70c base for Pittsburg shipment, although 1.60c base Pittsburg for shipment west has been shaded. The market on shafting has been shifty for the past 10 days and various deviations from the accepted discounts have been made. These deviations have been from 52½, 50 and 5 to 50 and 2½ off in large lots, but the generally accepted quotation is 50 and 5 off. To the small buyers the discounts range from 45 off to 50 and 2½ off. We quote as follows:

Common iron bars, 1.70c to 1.75c Pittsburg in carload lots and over, 1.75c to 1.80c in less than carloads; 1.60c base Pittsburg, plus freight to point of shipment on western deliveries; Bessemer steel bars, 1.60c net for future deliveries; 1.85c to 1.95c out of stock; plow and cultivator, 1.60c net; channels, angles, zees, tees, under three inches, 1.70c, all f. o. b. Pittsburg. The following differentials are maintained on steel. Less than 2,000 pounds, 0.10c advance; less than 1,000 pounds of a size, 0.30c advance. Cold rolled and ground shafting, 50 per cent off in carloads, and 45 per cent in less than carloads, delivered in base territory; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flats, 1.60c to 1.65c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.10c to 2.15c. The price of planished and machine straightened tire is 1.80c, base, half, tire extras. Iron finished tire up to 1½ inch and over to be sold on regular bar basis of 1.60c base, half extras, steel card.

Structural Material.—The new business on beams and shapes continues to lead all other branches in finished lines from a tonnage standpoint, and urgent demands for shipment of material to be used in construction work now under way are being received. Fabricating companies are taking on but very little new work, as building operations are being held up on account of the tight money market and a feeling of uncertainty as to what next year will bring forth. Prices are unchanged and we quote as follows:

Beams and channels, 15-inch, and under, 1.70c; over 15 inches, 1.90c; zees, 1.70c; tees, 1.70c; angles from three to six inches inclusive, 1.70c; over six inches, 1.80c; universal and sheared plates, 6¼ inches and wider, 1.80c base.

for wire products is heavy for this time of the year, with fencing in the lead closely followed by the demand for wire nails. As far as can be learned nobody is shading prices, which are firm at the advance of Sept. 3. We quote:

Wire nails, jobbers' carload lots, $2.05, retailers' carload lots, $2.10; less than carloads, $2.15; painted barb wire, $2.20 for jobbers in carloads; retailers in carloads, $2.25; and less than carload, $2.35; with 30c for galvanizing; plain wire, 1.90c for jobbers, and $1.95 by carload.

Merchant Pipe.—The pipe market is in a very good shape and all producers of merchant pipe have orders on their books to run them several months ahead without taking on additional business. Specifications have been running comparatively light as against six months ago, but in point of tonnage are still large. On account of the filled up condition of the order books, no definite delivery promises are being made. The talk of shading prices has entirely disappeared and producers in Pittsburg, Youngstown and Steubenville are holding firm to the official card. We quote the following official discounts to consumers in large lots:

	—Steel— Black.	Galv.
⅜ and ¼ inch	65	49
⅜ inch	67	53
½ inch	69	57
¾ to 6 inches	73	63
7 to 12 inches	70	55
EXTRA STRONG PLAIN ENDS.		
¼ to ⅜ inch	58	46
½ to 4 inches	65	53
4½ to 8 inches	61	49
DOUBLE EXTRA STRONG PLAIN ENDS.		
½ to 8 inches	54	43

Wrought Iron Pipe.—With one exception, and that is an eastern producer of wrought iron pipe, prices are being firmly maintained and the demand is good on account of the filled up condition of manufacturers of steel pipe. We quote the following discounts quoted by Pittsburg manufacturers, these being shaded an extra 5 by the interest referred to:

RANDOM LENGTHS WITH THREADS AND COUPLINGS—CARLOAD LOTS.	Black.	Galv.
⅛, ¼ and ⅜ inch	59	43
½ inch	62	51
¾ and 6 inch	67	57
7 and 8 inch	62	46
PLUGGED AND REAMED.		
1 to 4 inch	65	55
EXTRA STRONG PLAIN ENDS.		
⅛, ¼ and ⅜ inch	52	40
½ to 4 inch, inc	59	47
4½ to 8 inch	55	42
DOUBLE EXTRA HEAVY PLAIN ENDS.		
½ to 3 inch, inc	48	37

Boiler Tubes.—We quote the following official discounts of the leading

	Iron.	Steel.
1 to 1½ inch	42	47
1¾ to 2¼ inch	42	59
2½ inch	47	61
2¾ to 5 inch	52	65
6 to 13 inch	42	59

2¼ inches and smaller, over 18 feet, 10 per cent net extra.
2¾ inches and larger, over 22 feet, 10 per cent net extra.

Coke.—The demand for furnace coke is strong and several sales at an advance over the prices quoted last week are noted. Standard Connellsville furnace coke is quoted $2.90 to $3 at the ovens. The demand for foundry coke is fair and $3.25 to $3.40 is quoted. There is no improvement in the labor situation in the Connellsville region, and nearly all operations are reporting a shortage of men at their plants.

Old Material.—The scrap market continues lifeless, and while it would not be strictly true to say that prices are weaker, on the other hand the transactions are small and there is no basis upon which to make quotations. The Steel Corporation is not buying. La Belle Iron Works during the week bought one or two small lots at prices ranging from $17.75 to $18. We quote the following nominal prices, gross tons, delivered in the Pittsburg district:

Heavy melting scrap, $17.25 to $17.75; rerolling rails, $18.75 to $19; bundled sheet scrap, $14.50 to $15; iron axles, $27 to $27.50; old iron rails, $21 to $22; No. 1 wrought scrap, $17.75 to $18.25; old car wheels, $24 to $24.50; low phosphorus scrap, $21 to $21.50; machine shop turnings, $13.75 to $14.25; cast borings, $12.75 to $13.25; No. 1 cast scrap, $19 to $19.50.

CHICAGO.

New Business Not Large, But Well Distributed—Pig Iron Very Quiet.

Office of THE IRON TRADE REVIEW,
1362 Monadnock Block, Oct. 1.

Actual business closed during the past week in this district has not been in large volume, but has been well distributed. Despite some quiet shading of prices on forging billets, the selling interests generally are disposed toward a somewhat firmer feeling though there is little in evidence upon which to establish stiffer prices. The demand for material for immediate consumption is good as shown by both specifications and inquiries, which are coming in freely. Requirements for 1908 are not being provided for in the volume usually experienced at this time. This year's business has been large according to estimates which show increases in several lines, the Illinois Steel Co., reporting an increase in its output of about 12 per cent over last year.

Contracts have been closed locally for 6,500 tons of steel for two boats, deliveries to begin at once and to be completed by Jan. 1. Other tonnages, the closing of contracts for which have been expected for some time, are still held up. A fair tonnage of rails, made up of 6,000 tons from a western railroad and an order from a street railway, was taken by the leading producer. Pig iron is quiet with strength exhibited only in the demand for silveries. The United States Cast Iron Pipe & Foundry Co. has closed a municipal order for 2,500 tons of 36-inch pipe and two other contracts aggregating 6,800 tons are pending. Inquiries for plates and sheets are fairly numerous, but there is little new business. Wire products are in good demand and deliveries of from two to six weeks can be given. The market for scrap is not strongly defined, with a varying sentiment in different quarters. The coke situation is very firm.

Pig Iron.—The week in pig iron has been very quiet with practically no selling. Small lots only have been traded in, some of which was resale iron, and prices remain uniformly as quoted a week ago. The demand for high silicon iron has made a price as high as $21 for 4 per cent, but the market remains at $20 to $20.50. Southern irons for last quarter shipment continue at $18 Birmingham for No. 2 foundry and $1 less for delivery in 1908. Trading in northern iron continues sufficient to take care of the daily output and a strengthening is expected in proportion to the buying which it is believed must still be done this year. An inquiry for 2,000 tons of basic for this year is out. There is no inquiry for iron for the first quarter and no quotations are being made. The prevailing price for local No. 2 foundry for delivery until the end of the year is $22.50 Chicago. We quote, Chicago delivery, as follows:

Lake Superior Charcoal	$26.50 to 27.00
Northern Foundry No. 1	23.50 to 24.00
Northern Foundry No. 2	23.00 to 23.50
Northern Foundry No. 3	22.50 to 23.00
Southern Foundry No. 1	22.85 to 23.35
Southern Foundry No. 2	22.35 to 22.85
Southern Foundry No. 3	21.85 to 22.35
Southern Foundry No. 4	21.35 to 21.85
Southern No. 1 Soft	22.85 to 23.35
Southern No. 2 Soft	22.35 to 22.85
Southern Gray Forge	20.85 to 21.35
Southern Mottled	20.35 to 20.85
Southern Silveries, 4 per cent Silicon	24.35 to 24.85
Southern Silveries, 5 per cent Silicon	25.35 to 25.85
Southern Silveries, 6 per cent Silicon	26.35 to 26.85
Jackson Co. Silveries, 6 per cent	30.40
Jackson Co. Silveries, 8 per cent	32.40
Jackson Co. Silveries, 10 per cent	34.40
Malleable Bessemer	23.00 to 23.50
Standard Bessemer	23.90 to 24.40
Valley Basic	22.40 to 22.90
Alabama Basic	23.35 to 23.85

Billets and Rods.—The movement in crude steel is light, and out of town mills have been offering small concessions for current business. Lo-

cal mills adhere to $36 Chicago for forging billets, but $34 has been done. Pittsburg interests are asking $29.50 to $30 for rolling billets; $37 for Bessemer wire rods; $38 for open hearth rods, and $31 to $31.50 for sheet bars, all f. o. b. that city.

Merchant Bars.—There is no cessation in the volume of specifications for steel bars. New tonnage has picked up in the week under review, an independent mill reporting new orders for an aggregate of 15,000 tons. Deliveries are slow on account of the congested condition of mill order books, and three months is the best that can be done on either current specifications or new business. There is a better feeling in bar iron than has prevailed for some months, although tonnage is not any freer. Mills, however, have no trouble in keeping their rolling schedules full and are gradually filling up on forward deliveries. Hard steel angles are firm at 1.75c, Chicago. Local mills report a good volume of business in this material with early deliveries hard to secure. Shafting continues uneven in price. Our quotations below are on carload lots, Chicago delivery:

Bar iron, 1.78c; soft steel bars and bands, 1.78c; half extras; soft steel angles, less than 3 x 3, 1.88c; hoops, 2.18c base, full extras; planished or smooth finished tire steel, 1.98c; iron finish, up to 1½ x ½ inch, 1.93c base; iron finish, 1½ x 1½ inch and larger, 1.78c base; channels for solid rubber tire, ¾ to 1 inch, 2.28c, and 1⅛ inch and larger, 2.18c; smooth finished machinery steel, 2.18c; flat sleigh shoe, 1.83c; concave and convex sleigh shoe, 2.08c; cutter shoe, 2.36⅛c; toe calk steel, 2.33c; railway spring, 1.98c; crucible tool steel, 7c to 9c, with higher prices asked on special grades. Quotations on shafting are 60 per cent off the list f. o. b. Pittsburg for car load lots, and 55 per cent off for less than car load lots. On iron and steel bars from local stocks, we quote as follows: Bar iron, 2.25c full extras; soft steel rounds, and square, 3-inch and larger, $2 per 100-lbs. base; flats, 2 inches to 4 inches by ⅛ inch and larger, $2 per 100 pounds base; 4½ inches by 5 inches and 6 inches by 5-16 inch and thicker, $2 per 100 pounds base; all ovals, half rounds, $2 per 100 pounds base; steel bands, $2 half extras; soft steel hoops, $2.50 full extras. Other sizes not mentioned above, $2 per 100 pounds base plus half extras.

Plates.—Business in plates is in good volume and the earliest delivery obtainable is Jan. 1. Delivery of orders now on the books of the leading producer will extend over until July 1 and specifications continue normally plentiful. Plates for two new boats, the total steel requirements of which will be in the neighborhood of 6,500 tons, have been ordered from the local mill, delivery to begin Oct. 1, and to be completed by the first of the year. One of these boats will be built at Superior and the other at Bay City. Prices remain as a week ago and we quote as follows:

Plates, ¼ inch and heavier, 6¼ to 100 inches wide, either universal or sheared, 1.70c Pittsburg base. For extras see Pittsburg report. Freight rate to Chicago, 18c per 100 pounds for carload lots, and 21c for less than carload lots. Jobbers' prices for shipment from local stocks are as follows: Tank steel, ¼ inch and heavier up to 72 inches wide, 2.20c; 3-16 inch up to and including 60 inches wide, 2.30c; 3-16 inch, 72 inches wide, 2.55c; No. 8 up to 60 inches wide, 2.50c. Flange steel, 25c extra; heads, 25c extra.

Sheets.—The advance in spelter last week has strengthened galvanized sheets. There is so much tonnage on the books of producers that it is problematical whether quotations on this product will be reduced this year. The American Sheet Steel & Tin Plate Co., it is said, cannot make deliveries on new business inside of fourteen to sixteen weeks, and an almost equal period is asked on black sheets. Independent mills are not so crowded, local interests asking six weeks on galvanized and about four weeks on light black gages. Blue annealed stock is much further behind. Specifications on old orders and new business continue in good volume, the entire output of western plants going into immediate consumption. Our prices are unchanged as follows:

Black sheets, Nos. 8, 9 and 10, 1.85c to 1.90c Pittsburg; No. 28, 2.60c Pittsburg. Galvanized sheets, No. 28, 3.75c Pittsburg. Freight to Chicago, 18c per 100 pounds for car load lots, and 21c for less than car load lots. Jobbers' prices on car load lots and less from store are as follows:

No. 10, 2.50c to 2.55c; No. 12, 2.55c to 2.60c; No. 14, 2.60c to 2.65c; No. 16, 2.70c to 2.80c; Nos. 18-20, 2.80c to 2.90c; Nos. 22-24, 2.85c to 2.95c; No. 26, 2.90c to 3c; No. 27, 2.95c to 3.05c; No. 28, 3.05c to 3.15c; No. 30, 3.35c to 3.45c. Galvanized sheets, Nos. 10 to 20, 3.50c to 3.55c; Nos. 22 and 24, 3.65c to 3.75c; No. 26, 3.85c to 3.90c; No. 27, 4.05c to 4.15c; No. 28, 4.25c to 4.35c; No. 30, 5.40c to 5.45c.

Structural Steel.—Specifications on structural steel are being submitted in good quantity and fabricators continue keen in their competition for business. The contract just let for the steel for the two boats carries a fair tonnage of structural material and inquiries for wants of the immediate future in other directions are fairly numerous. Requirements for future needs are noticeably lacking and it is probable that present orders represent actual consumption more nearly than has been true for some time past. Several inquiries now pending, but delayed in their development into orders by the money situation, can be given this year deliveries at present, but the mills are rapidly filling up and this will not be true long. Prices remain without change as follows:

Beams and channels, 3 to 15 inches, inclusive, 1.70c Pittsburg. For extras see Pittsburg report. Freight rate from Pittsburg to Chicago, 18c per 100 pounds for carload lots, and 21c per 100 pounds for less than carload lots. Quotations from store are as follows:

All angles, three inches and larger, including six inches, $2.05 per 100 pounds; angles, over six inches, $2.10 per 100 pounds base; beams, 3 to 15 inches inclusive, $2.05 per 100 pounds base; channels, three inches and larger, $2.05 per 100 pounds base. Less than carload lots are $1 a ton higher than foregoing prices.

Rail and Track Supplies.—There is little doubt that a very large tonnage of rails is now required to meet the needs of a number of railroads and that inquiries for that material are being withheld awaiting the result of the conference with the manufacturers on the question of standard specifications and design for rails. This matter should be settled in the course of a fortnight. The local mill has just taken a contract to fill an order for from 6,000 to 7,000 tons for a western railroad. The condition in rail business applies to track supplies and our quotations on spikes can be shaded on desirable orders.

Bessemer rails, $28 to $30; less than 500-ton lots, $32; open-hearth rails, $29; light rails, Bessemer, 30 to 45-pound sections, $34; 25-pound, $35; 20-pound, $36; 16-pound, $37; 12-pound, $38, and lighter sections down to 8-pound, $44.50, all f. o. b. mill. Track supplies vary in price according to quantity and delivery. On orders accompanying rail contracts for future delivery, we quote, f. o. b. Joliet: Angle bars, 1.65c; spikes, 2.10c to 2.15c; bolts with square nuts, 2.60c; with hexagon nuts, 2.75c. For carload

lots or less, for prompt shipment, the following prices are asked: Angle bars, 2.25c to 2.75c; spikes, 2.40c to 2.50c; bolts with square nuts, 2.85c; with hexagon nuts, 3c.

Cast Iron Pipe.—The season is rapidly approaching for the letting of contracts for pipe for next spring and summer delivery. During the few weeks that now precede this period, a rather quiet situation is expected. The contract covering the 2,500 tons of 36-inch pipe required by the city of Columbus, O., has been assigned to the United States Cast Iron Pipe & Foundry Co., though the letting has not been finally confirmed by the city council. The city of Los Angeles is in the market for 6,000 tons of pipe and the business will probably be placed within a week as will also another municipal contract amounting to 800 tons. Prices have been shaded off $1 a ton and we quote 4-inch water pipe, $37; 6 and 8 to 12-inch, $36; larger sizes, $35; gas pipe, $1 a ton higher.

Merchant Pipe and Boiler Tubes.—No appreciable change is noted in the western trade in these products. Consumption is undiminished and prices are without change. Jobbers in agricultural districts report low stocks and are pressing mills for heavier and quicker shipments, but improvement in this respect is slow in developing. Boiler tubes are especially active just now, many boiler manufacturers laying in their winter's supply.

We quote mill discounts, Chicago delivery, carload lots, as follows: On steel pipe, jobbers are allowed a concession of one point and five per cent additional from the schedule in force:

MERCHANT PIPE.

	—Steel— Black.	Galv.
¾ to 6 inches, inclusive.....	71.2	61.2
BOILER TUBES.		
	Steel.	Iron.
2¼ to 3 inches, inclusive....	62.2	49.2

Mill quotations on iron pipe are from four to five points higher than above. A concession of one point from the following quotations is allowed by Chicago jobbers on carload orders for shipment from local warehouse stocks. We quote for less than carload lots as follows:

MERCHANT PIPE.

	Black.	Galv.
⅛ to ¼ inch.....	61	45
⅜ inch	63	49
½ inch	65	53
¾ to 6 inches.....	69	59
7 to 12 inches	65	50

Minimum prices for wrought iron pipe, carload lots or greater, from Chicago stocks, are as follows: ⅛ inch to ¼ inch, 55; ⅜ inch, 57; ½ inch, 59; ¾ inch to 6 inches, 64; 7 inches to 12 inches, 59. Boiler tubes from store are unchanged at 60 off for steel, 47½ for iron, and 42½ for seamless, base sizes, 2⅛ inches to 5 inches.

Wire Products.—The trade in all lines of wire products continues good without change and there is more business in barb wire than can be taken care of. The demand for wire nails is better than it has ever been, but the mills are still able to promise deliveries in two weeks. Deliveries on barb wire run from four to six weeks. Prices are correspondingly firm and we quote to jobbers, Chicago delivery, as follows:

Wire nails, $2.34; painted barb wire, $2.38; galvanized barb wire, $2.68; smooth annealed wire, $2.08; smooth galvanized wire, $2.38; polished staples, $2.33; galvanized staples, $2.63. Carload lots to retailers, five cents higher; less than carload lots, 15 cents higher.

Coke.—Western demand for coke has been somewhat affected this week by the slow movement in pig iron. Trading is almost wholly for forward deliveries. Prices are firm at $3.25 to $3.40 for Connellsville 72-hour foundry brands, and at $2.80 to $2.90, ovens, for high grade standard Connellsville furnace coke.

Old Material.—Trading in scrap during the week has been altogether wanting and an apparently developing dullness has made the situation very uncertain as to the trend of prices and the wisdom of immediate buying. Practically the only instance where sufficient grounds exist for quoting a definitely changed price as compared with a week ago is on rerolling rails, which will be sold, if at all, not under $18. This price was brought out as a bottom figure by two or three inquiries which it is expected will result in trades within a week or two, and the strengthening influence was an inquiry from a dealer to buy rerollers at prices only fractionally lower in order to fill a good sized order from a large local interest. Aside from this, consumers of old material appear pretty well filled up for the balance of the year and where other changes in quotations are noted the reason is largely sentimental. A list containing 1,200 tons has been submitted by the Chicago & Northwestern railroad. Quotations are as follows, gross tons in the first paragraph:

Old Car Wheels.....	$24.50 to 25.00
Old Iron Rails	19.75 to 20.25
Rerolling rails (3 ft. and over).	17.75 to 18.00
Old Steel Rails (3 ft. and under)	17.00 to 17.50
Light Section Relayers, 45 lbs. and under, subject to inspection..	30.00 to 32.00
Relaying Rails, subject to inspection	28.00 to 30.00
Frogs, Switches and Guards.....	15.50 to 16.00
Heavy Melting Steel.....	15.00 to 15.50

We quote net tons as follows:

No. 1 R. R. Wrought.....$	14.50 to 15.00
No. 2 R. R. Wrought.....	13.50 to 14.00
Knuckles, Couplers and Springs.	14.50 to 15.00
Shafting	17.50 to 18.00
Iron Car Axes	23.50 to 24.00
Steel Car Axles.....	20.50 to 21.00
Dealers' Forge No. 1.....	11.75 to 12.00
Pipes and Flues.....	11.00 to 11.50
No. 1 Cast, 150 lbs. and less...	16.75 to 17.25
No. 1 Mill	10.00 to 10.50
Mixed Busheling (Nos. 1 and 2)	10.50 to 11.00
Country sheet	8.00 to 8.50
No. 1 Boiler Cut.....	10.00 to 10.50
Boiler Punchings	14.00 to 14.50
Cast Borings	8.50 to 9.00
Mixed Borings, etc.....	8.50 to 9.00
Machine Shop Turnings	10.50 to 11.00
Railroad Malleable	15.50 to 16.00
Agricultural Malleable	14.25 to 14.75
Stove Plate and Light Cast Scrap	14.25 to 14.75
Old Iron Splice Bars.....	16.50 to 17.00

CLEVELAND.

Figures at Hand Indicate Forty Million Ton Ore Movement—New Boat Awarded.

Office of THE IRON TRADE REVIEW,
Browning Bldg., Oct. 1.

Iron Ore.—From the figures available at this date the indications are that September has more than held its own in the record-breaking ore movement from the Superior regions. Duluth, the only harbor yet reporting shows a total of 2,203,638 tons handled, against 2,051,280 tons last month, a gain of 152,358 tons, or against 1,750,116 tons in September, 1906, a gain of 453,522 tons. With Duluth as a basis of computation, it would seem likely that the month's total would equal, or surpass, that of August, which was 6,806,811 tons. By a very conservative estimate, it appears certain that September operations have brought the season's total to Oct. 1, 1907, up to 31,000,000 tons, compared with 28,150,755 tons to Oct. 1, 1906. To reach the sought-for 40,000,000-ton movement it will be necessary to bring down approximately 9,000,000 tons in October, November and December. Last year during these three months 9,400,000 tons were moved, and with ordinarily favorable weather the probability is extremely strong that the 40,000,000 mark will be reached. The car shortage is becoming more acute and is retarding operations somewhat. A few sales of small tonnages continue, one interest having disposed of 15,000 tons of Mesabi ore during the week.

Pig Iron.—The waiting disposition of prospective pig iron purchasers relative to unfilled fourth quarter and next year's requirement continues to be clearly manifested by the market's developments. Beyond several small inquiries from eastern melters for deliveries beginning Jan. 1, and one for 500 tons of malleable, there is no interest for next year's iron.

The sales of the week have been few and of small tonnage, consisting chiefly of piece-in lots of prompt iron, disposed of generally on the basis of $22 local furnace. Though requests for the withholding of iron on the part of melters under contract have not been many, a further improvement is still noted in this respect, and such cases are now quite few, tending to reflect a good state of the foundry business. Active buying of pig iron in this territory is not expected before November. We quote, f. o. b. Cleveland, for the remainder of the year, as follows:

Bessemer	$22.90
No. 1 Foundry	22.00 to 22.50
No. 2 Foundry	21.50 to 22.00
No. 3 Foundry	20.50 to 21.50
No. 2 Southern	22.85
Gray Forge	20.00 to 20.50

Finished Material.—Though a number of fair-sized transactions in this district have fallen within the week, little improvement is shown in the volume of new business generally and a more active competition for orders than has existed for some time is in force. Tonnages are being freely specified against contracts, however. The contract to furnish 2,500 tons of steel for a new freighter building by the American Ship Building Co., has been awarded to the Jones & Laughlin Steel Co. Other boats are projected, their materialization depending largely upon the financial situation. The American Bridge Co. has secured an order for 1,700 tons of structural material for the new Y. M. C. A. building at Detroit. Several fair sized bar iron contracts, coming principally from railroads in the northwest desiring shipment before lake navigation closes, have been closed within the week, but the market has gained no strength and remains quite weak. Deliveries on round lots can be made by the mills in from two to three weeks. There is also a decrease in the shipment period for steel bars, and certain sizes can be obtained in from six to eight weeks. The weakness in standard railroad spikes, mentioned in THE IRON TRADE REVIEW several weeks ago, continues, and sellers generally have dropped to a level of from $2.00, mills, for desirable business, to $2.10 for smaller orders. Premium business in plates has disappeared and deliveries of from three or four weeks are being promised on tank plates. An eastern mill announcing a tonnage of forging billets available for the market has encountered a good demand at a price of $33 Pittsburg, gross tons, in carloads for base sizes. Some sales of merchant steel are reported and there are inquiries in the market for fair lots of forging steel and cold rolled bars. Warehouse trade of jobbers continues active.

Coke.—Although new business is not in large volume, coke remains in a firm position. At the same time, tonnages are not easy to obtain on account of the sold-up condition of the producers. We note the sale of a considerable tonnage of high grade furnace coke at the bottom price of $3 ovens. For delivery the remainder of the year we quote furnace coke at from $3 to $3.15 ovens, and foundry coke at from $3.25 to $3.50 ovens.

Old Material.—There is practically no change in old material and a dull, listless market is prevailing. Lower prices are expected before any recovery is manifested. Cast scrap is somewhat weaker, but grades generally are satisfactory. Railroad offerings for September, now in the field, are smaller than usual. Pennsylvania lines west are asking bids on a lot of several thousand tons. The Erie railroad has also announced an accumulation. We have revised our prices and quote, f. o. b. Cleveland, gross tons, as follows:

Old iron rails	$21.50 to 22.00
Old steel rails (re-rolling)	17.50 to 18.50
Old steel rails (under 6 feet)	17.50 to 18.50
Old car wheels	22.50 to 23.50
Steel boiler plate	14.00 to 14.50
Steel axles	21.00 to 22.00
Malleable iron (railroad)	18.00 to 18.50
Malleable iron (agricultural)	15.00 to 16.00
Heavy steel	16.00 to 16.50
Country mixed steel	14.00 to 14.50
Low Phosphorus	20.00 to 21.00

We quote net tons as follows:

No. 1 R. R. wrought	$16.00 to 16.50
No. 1 busheling	14.00 to 14.50
No. 1 machine cast	17.00 to 18.00
Iron axles	23.00 to 24.00
Axle turnings	12.50 to 13.00
Machine shop turnings	11.00 to 11.50
Grate bars	14.00 to 14.50
Pipes and flues	12.50 to 13.00
Tank iron	12.00 to 12.50
Hoop and band iron	8.00 to 8.50
Sheet iron	7.00 to 8.00
Wrought drillings	11.00 to 11.50
Stove plate	14.00 to 14.50
Cast borings	10.50 to 11.00

CINCINNATI.

Market is Quiet and Pig Iron Sales Confined to Small Tonnages.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., Oct. 1.

Pig Iron.—But little demand has been found for pig iron through sales agencies here this week. The few sales were confined to small tonnages for prompt shipment. The bulk of the business was for car lots and these were not plentiful. Inquiries were scarce and there is but little specified tonnage being figured on. Prices are unchanged. The little iron called for is limited to the higher grades and the lower grades remain dull. High silicon irons are selling in small lots and there is enough call for them to hold quotations strong at recent schedules. Northern eight per cent silicon is quoted at $29 to $30 at furnace and southern four to five per cent is selling at $20 to $20.50, Birmingham.

Southern No. 2 foundry is going mainly at $18.50 Birmingham as the sales are for small lots and there is not enough competition on such orders to bring out lower prices. Some investment iron can be found at $18 Birmingham, but furnaces are still holding firmly to the $18.50 basis on the high grades.

Northern iron is quotable at $21 to $21.50 at furnace with but little selling. We quote for prompt shipment, delivered Cincinnati, as follows:

Southern Foundry No. 1	$21.75 to 22.25
Southern Foundry No. 2	21.25 to 21.75
Southern Foundry No. 3	20.25 to 20.75
Southern Foundry No. 4	19.25 to 19.50
Southern No. 1 Soft	21.75 to 22.25
Southern No. 2 Soft	21.25 to 21.75
Southern Gray Forge	18.75 to 19.00
Northern No. 1 foundry	22.70 to 23.20
Northern No. 2 foundry	22.20 to 22.70
Northern No. 3 foundry	21.20 to 21.70

Buyers decline to take any interest in forward deliveries. As we enter the last quarter of the year, there seems to be no call for new contracts to cover that period, indicating that buyers are well covered for the next three months. So far as next year is concerned, southern iron can be had at $17 to $17.50 Birmingham, but these prices have not induced orders. The fact that melters are taking their iron on contracts and making but few requests to defer shipments is giving confidence to the furnace interests in the outlook, and, as furnaces are not accumulating iron, they are inclined to hold the present schedules. We quote for last quarter delivered Cincinnati as follows:

Southern Foundry No. 1	21.75 to 22.25
Southern Foundry No. 2	21.25 to 21.75
Southern Foundry No. 3	20.25 to 20.75
Southern Foundry No. 4	19.25 to 19.50
Southern Foundry No. 1 Soft	21.75 to 22.25
Southern Foundry No. 1 Soft	21.25 to 21.75
Gray Forge	18.75 to 19.00
Northern Foundry No. 1	22.70 to 23.20
Northern Foundry No. 2	22.20 to 22.70
Northern Foundry No. 3	21.20 to 21.70

Finished Material.—New business is moderate so far as contracts are concerned, but the specifications on old contracts are fairly good. There is good general call for small lots and retail business at the stores is quite satisfactory. Small orders are filled here at the following prices:

Angles, 3 x 3 and over, 2.15c to 2.25c; beams and channels, 15 inches and under, 2.15c; small angles and architectural channels, 2.10c base; plates ¼-inch and heavier, 2.10c; 3-16 inch, 2.20c; No. 8, 2.20c; sheets (blue annealed) No. 10, 2.30c; No. 12, 2.35c; No. 14, 2.40c; No. 16, 2.50c; box annealed sheets, Nos. 18 and 20, 2.65c; Nos. 22 and 24, 2.75c; Nos. 25 and

26, 2.80c; No. 27, 2.85c; and No. 28, 2.95c. Iron and steel bars, $2 base; boiler tubes, 62 per cent off base; turnbuckles, 45 per cent off; rivets, 3.15c base; cold rolled shafting, 45 per cent off list; steel tire, 2.10c base.

Coke.—The market is firm and the offerings are becoming lighter. Furnaces are barely able to keep a full supply on hand. There has been a falling off in shipments owing to small car supply and lack of labor at the ovens. A little inquiry is coming out for next year's supply. There is a good run of small orders for foundry coke and current offerings are taken up readily enough to keep prices steady. As the supply is about equal to the requirements, a curtailment of the shipments would be likely to cause an advance in prices. Quotations in the leading coke producing districts are as follows:

Wise County, Va., Furnace Coke	3.00 to 3.25 per ton
Pocahontas Furnace Coke, prompt shipment	2.60 to 2.75 per ton
Pocahontas Foundry Coke	3.00 to 3.25 per ton
Connellsville Furnace Coke, prompt shipment	2.85 to 3.00 per ton
Connellsville Foundry Coke	3.25 to 3.50 per ton
New River Foundry Coke, prompt shipment	3.35 to 3.50 per ton
New River Furnace Coke, contract	2.85 to 3.00 per ton

Old Material.—The market rules dull and easy with but little call from melters and quotations, while unchanged, could probably be shaded. We quote dealers' prices as follows:

Old No. 1 R. R. wrought net tons	$15.50 to 16.00
Cast machine and fdy, net tons	18.00 to 18.50
Old iron rails, gross tons	22.00 to 23.00
Old steel rails (re-rolling) gross tons	18.00 to 19.00
Old short lengths, gross tons	19.00 to 20.00
Old iron axles, net tons	25.00 to 26.00
Heavy melting scrap, gross tons	17.50 to 18.50
Stove plate, net tons	13.50 to 14.50
Wrought turnings, net tons	11.50 to 12.50
Cast borings, net tons	9.75 to 10.75
Car wheels, gross tons	23.00 to 24.00

PHILADELPHIA.

Many Small Sales of Pig Iron—Prices Show Little Change.

Oct. 1.

Pig Iron.—The most notable feature of the past week has been the large number of inquiries from foundrymen and other moderate-sized consumers, who have come into the market for small amounts, ranging from 10 to 200 tons. Many orders have followed the inquiries. Taken in connection with the large purchases made by steel-making companies, pipe-founders and others earlier in the month, these sales aggregate a considerable total, so large, in fact, that one important house booked a greater tonnage in September than in any month of the year except January and March. It cannot be said, however, that these sales developed any improvement in prices, which remain practically unchanged. Furnace men hardly looked for any betterment, but feel in a more cheerful mood now that they are practically assured of orders enough to keep their plants busy through the rest of the year. There is a disposition to fight shy of business for 1908 on both sides. Consumers have made offers, but their figures are generally so low that producers decline to consider them until they can read the future a little more clearly. Prices, which are still a little inclined to sag, may be quoted as follows:

No. 1X Foundry	$21.00 to 21.75
No. 2X Foundry	20.00 to 20.75
No. 2 Plain	19.50 to 20.00
Standard Gray Forge	18.50 to 19.00
Basic	19.00 to 19.50
Low Phosphorus	27.00 to 27.50

New Material.—There is very little doing in the way of new business in some lines, notably billets, which are offered at a reduction from prices recently ruling. Structural material is in a little better demand, but is nothing to boast of. Prices show some declines and may be quoted as follows: Beams, channels and angles, according to specifications, 1.85c to 1.90c; refined iron bars, 1.75c to 1.80c; steel bars 1.75c to 1.85c; plates, 1.75c to 1.80c.

Old Material.—There is still a little buying, but it is of the hand to mouth character that has ruled so long and reflects the waiting attitude of the mills on the finished product market. Until the future of this clears up, there is hardly likely to be any improvement in the demand for scrap. Prices, which show few changes, follow:

Old steel rails	17.50 to 18.00
No. 1 steel scrap	16.25 to 16.75
Old steel axles	20.00 to 21.00
Old iron axles	27.00 to 28.00
Old iron rails	19.00 to 20.00
Old car wheels	22.00 to 23.00
Choice scrap R. R. No. 1 wrought	17.75 to 18.25
No. 1 yard scrap	16.25 to 16.75
Machinery scrap	18.50 to 19.00
Low phosphorus scrap	20.50 to 21.00
Wrought iron pipe	14.25 to 14.75
No. 1 forge fire scrap	14.00 to 14.50
No. 2 forge fire scrap, ordinary	10.00 to 10.50
Wrought turnings	13.50 to 14.00
Axle turnings, heavy	14.00 to 14.50
Cast borings	12.00 to 12.50
Stove plates	15.00 to 15.50

NEW YORK.

Low Pig Iron Prices—Strong Competition in Structural Material.

Office of THE IRON TRADE REVIEW, Room 1005, No. 90 West St., Oct. 1.

Pig Iron.—With No. 2 foundry selling as low as $19 at eastern furnace, malleable at $20.50 and basic at $18 or $18.25, furnace, pig iron producers are beginning to scan their production costs with more interest and it is not unlikely that several stacks will go out of blast in the near future unless the market shows signs of an upward turn. The week under review developed considerable inquiry for both prompt iron and future delivery, but this was chiefly toward the beginning of the week and toward its close a more quiet tone prevailed. If this lull continues, it means the end of an active period of about three weeks, in which good tonnages of basic and pipe-making irons were disposed of, with a fairly large scattering of foundry iron. The basic, sales of which ran into the tens of thousands, went on the basis of $18.75 to $19 delivered. On 2X foundry $19, furnace, is the lowest price which has come to light and moderate tonnages sold at considerably higher figures. Southern furnaces are still holding at $18.50, but of course are taking no business in this territory. Some limited sales of malleable have been made recently on the basis of $20.50 to $21, furnace, for early shipment. We quote, tidewater delivery, as follows:

Northern Foundry No. 1	$21.00 to 21.50
No. 2X Foundry	19.75 to 20.25
No. 2 Plain	19.00 to 19.50
Malleable	21.50 to 22.00
No. 2 Southern Foundry	22.00 to 23.00
Basic	18.75t o 19.00

Ferro-Manganese.—There has been a very fair volume of business in this territory and the Pittsburg district during the week, but at a slightly lower level. For spot and early shipment $55 to $56 is being secured, with $53 to $54 the price for later delivery. Only the necessity of filling orders already on hand and mostly at higher figures is keeping some producers in operation.

Finished Material.—The larger finishing concerns report specifications as considerably improved and seem to be well satisfied with the situation, but some of the smaller mills are complaining that new orders are extremely scarce and that for these they are forced to compete with interests which usually pay little attention to business of this class. There are also rumors that on structurals some shading is being done. In plates local consumers are not well supplied with work and are buying sparingly. The big 140-inch mill of the Lukens Iron & Steel Co. at Coatesville has shut down for a week's repairs.

Structural bookings of September aggregated more than 120,000 tons, of which only about 32,000 tons went to the American Bridge Co. The bulk of the business placed was made up of small jobs on which competition was very brisk and independent interests shared liberally. The McClintic Marshall Construction Co. took a 1,900-ton bridge order from the Chicago and Northwestern. The Pittsburg Plate Glass Co. placed con-

tracts for 1,100 tons and 900 tons were placed for Towanda bridges. Grade crossing work is coming out well, western roads being in the market for more than 5,000 tons. The Carnegie Steel Co. has sold a lot of 2,500 tons of steel bars for concrete reinforcement and there is a Philippine inquiry for 900 tons.

Export business is improving. An inquiry is current for 20,000 tons of 45-pound rails for Turkey; Chile is asking tenders on important bridge tonnages, a large cantilever bridge is to be built at Canton, China, and it is understood that the Imperial railway of Japan has closed for 5,000 tons of bridge material. Twelve more barges are to be bought for Panama.

Bar iron is in only fair demand at 1.60, Pittsburg. Some eastern mills are reported to be working only part time. We quote as follows:

Angles, 3 to 6 inches x ¼-inch and heavier, 1.86c; beams, 3 to 15 inches, 1.86c; tees, 3 x ¼-inch and heavier, 1.91c; plates, carloads, tank, 1.96c; marine boiler, 2.26c; bar iron, 1.76c; soft steel bars, 1.76c; sheets, No. 28, black, 2.60c.

Old Material.—Wrought pipe and stove plate are the most active lines, being in good demand, but otherwise the entire list is dull. Transactions are of limited tonnage, consumers being of the idea that still lower prices will prevail and that hand-to-mouth buying is the wise course. Stocks in yards are uniformly low and in some cases are practically nil. We quote, New York delivery, gross tons, as follows:

Old iron rails	$24.50 to 25.00
Old steel rails, rerolling	18.00 to 18.50
Relaying rails	27.00 to 27.50
Old car wheels	22.50 to 23.00
Old iron car axles	26.00 to 26.50
Old steel car axles	19.00 to 19.50
Heavy melting steel	14.50 to 15 00
No. 1 railroad wrought	16.00 to 16.50
Iron track scrap	15.00 to 15.50
Wrought pipe	12.00 to 12.50
Cast borings	10.00 to 10.50
Wrought turnings	11.50 to 12.00
Heavy cast scrap	16.00 to 16.50
Railroad malleable	15.00 to 16.00
Agricultural malleable	15.00 to 15.50
Stove plate	13 50 to 14.00
Grate bars	13.00 to 13.50

BUFFALO.

Consumers Look For Concessions Which Do Not Come Readily.

Sept. 30.

Pig Iron.—Some small sales are reported and business in general is confined to small lots, but the aggregate is satisfactory. Some buyers, however, are holding off on their requirements for the fourth quarter, but the active interest being displayed in the market is indicative of a buying movement which is expected to increase gradually from now on. The general tone of the market is about the same as it was last week and dealers generally are anticipating no heavy purchases immediately. Buyers seem to be exercising the same caution that characterized their purchases for the past several weeks.

Some inquiries for first quarter delivery are reported and in a few instances prices have been quoted, but no general quotations for that period are yet in circulation.

Although the consensus of opinion brings the price of No. 2X foundry down a dollar less than quoted last week, it is difficult to hold the quotations down to any set scale just now. But the prices for fourth quarter may be quoted as follows:

No. 1X Foundry	$21.75 to 22.00
No. 2X Foundry	21.00 to 21.50
No. 2 Plain	20.75 to 21.25
No. 3 Foundry	20.50 to 20.75
Malleable Bessemer	22.00 to 22.50
Gray Forge	20.00 to 20.50
Charcoal	27.00 to 27.50

ST. LOUIS.

Tone of Pig Iron Market Improves—Numerous Sales Made.

Sept. 30.

Pig Iron.—Local dealers report the tone of the pig iron market as much better than it has been for the last several months. All quotations under $18, Birmingham basis for No. 2 for this year have disappeared, and $18 now seems to be the prevailing mark, although quite a number of Birmingham firms are holding steady for $18.50 for No. 2 Birmingham basis. It is confidently believed in St. Louis that with the amount of business that is offered, $18 quotations will be things of the past before a great while. Quite a number of orders for the last quarter of the present year were placed last week, and many good sized ones which are now pending will be closed before the end of this week it is believed. It is also learned that some good tonnage orders have been booked for the first quarter of 1908 during the last few days at private figures.

The car shortage is assuming worse proportions, according to one pig iron man who returned from Birmingham today.

Our quotations for this year's delivery, f. o. b. Birmingham, to which $3.75 freight is to be added, follow:

No. 1 Southern	$18.50 to 19.00
No. 2 Southern	18.00 to 18.50
No. 3 Southern	17.50 to 18.00
No. 4 Southern	17.00 to 17.50

Coke.—The coke market continues strong, with numerous large and small orders for prompt shipment. A number of contracts are pending and probably will be placed this week. Prices show an upward tendency, ruling as follows: Connellsville, 72-hour coke, $3.50 to $3.75, f. o. b. ovens; furnace, $2.50 to $3.10. The freight to East St. Louis is $2.80, and to St. Louis $2.90.

Old Material.—There is a much better feeling manifested by St. Louis dealers, due, it is said, to a number of mills resuming operations. Quite a few items show an advance in prices. Our quotations follow:

	GROSS TONS
Second-hand Relaying Rails, according to time of delivery	$29.00
Steel rails (less than 3 feet)	15.00
Car wheels	24.50
Re-rolling steel rails	17.00
Heavy melting steel	15.00
Country steel mixed	12.00
Iron rails	22.00
	NET TONS
No. 1 R. R. wrought	$16.00
No. 2 R. R. wrought	15.00
Iron splice bars and fish plates	17.00
Iron car axles	24.50
Steel car axles	19.00
Iron shaftings (3 to 6 inches)	18.00
Country wrought	12.00
Locomotive tires, smooth inside	15.00
Pipes and flues	12.00
Heavy machinery	15.00
R. R. cast (less than 300 pounds)	14.50
No. 1 Busheling	13.00
No. 2 Busheling	12.00
Boiler sheet and rings	12.00
R. R. cast borings (free of inferior quality)	10.00
R. R. wrought turnings	13.50
Machine shop turnings (free from brass)	11.00
Railroad malleable	15.00
Agricultural malleable	14.00
Cast stove plate	11.00

BRITISH IRON MARKET.

Depression in Pig Iron With Lowest Prices Since Early in April.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Sept. 21.

This has been a rather depressing week in pig-iron. Yesterday, for example, not a transaction was recorded in the Glasgow warrant market until the afternoon session when 1,500 tons of Cleveland were dealt in. There has been a fall in the price of warrants on the week of 2s 7d, yesterday's quotation being 54s. 6½d. ($13.35) representing a fall of 2½d. on the previous day. The one hopeful feature is that stocks at Middlesbrough continue to reduce, the decrease on the month being 19,330 tons. Present quotations are the lowest since the first week in April, and the shipments are the poorest since February. This state of things is very unusual in mid-September, when an improvement is generally manifest after the summer dullness. The change on the Tees is very marked. There are now no steamers waiting turns as they were three months ago, and cargoes can be promptly obtained. The amount of iron now in stock at Middlesbrough is 165,950 tons, as compared with 604,700 tons a year ago. There has been a fall on the week of half a crown in

hematite, partly because of the complete cessation of American buying and also because of poorer prospects of Continental trade. It is curious that in spite of this state of things stocks continue to fall, the reduction since last week being 579 tons, leaving 9,817 tons in stock, with none at all in makers' hands. Raw material is so dear that further reductions seem very unlikely. Midland brands of pig iron are appreciably stronger than those in the north and it is remarkable that this week some Staffordshire and Derbyshire makers have been able to obtain advances of 6d. on recent figures. The quotations for Staffordshire part mine are 60s. ($14.68) and Northampton forge iron 57s. 6d. ($14.80).

METAL MARKET.

NEW YORK.

Oct. 1.

Copper.—The effect of recent sweeping reduction in price was made clearly manifest during the past week, when selling was stimulated to a considerable extent, both for export and domestic account. The bulk of business placed, it is true, was for shipment abroad, a sale of electrolytic for export to China attracting a great deal of attention, but improved demand was also noted for local consumption. The week saw another reduction by the leading selling interest to a flat 15c for electrolytic, but smaller producers had already been making this quotation and promptly began to shade it, thus repeating the program of all recent "official" reductions. It is to be noted however, that concessions are now more moderate and are offered less willingly than during the summer and it begins to look as if the bottom figure may be somewhere near the present level, 14¾c to 15¼c for Lake, 14½c to 15c for electrolytic, and 14¼c to 14¾c for casting. German consumption up to the close of July was practically the same as that of the same period in 1906. The base price of copper sheets has declined and the base price of copper wire is now 16¼c.

Pig Tin.—There was a continuance early in the week of premium business in spot metal, but this was later diminished somewhat under considerable pressure to sell, though transactions were not large. The London market is still firm. The current quotation is 37c to 37¼c.

Pig Lead.—The range of present prices is from 4.75c, New York, and 4.67½c, St. Louis, asked by the leading interest, to 4.65c, New York, and 4.55c, St. Louis, at which independent interests are taking on business.

Spelter.—The tone of the market has become distinctly stronger. A reduction in ore production, indicating an early scarcity in the metal, has caused several selling interests to withdraw from the market and has alarmed consumers into a brisk buying movement, with the result of an upward tendency in prices. The market is now about 5.25c, New York, and 5.10c, St. Louis.

Antimony.—Here, too, a marked improvement has set in and prices are tending upward, with Hallett's selling at a higher figure than Cookson's for the first time in a number of years. The current level is: Cookson's, 10½c to 10¾c; Hallett's, 10⅝c to 11c; ordinary brands, 10¼c

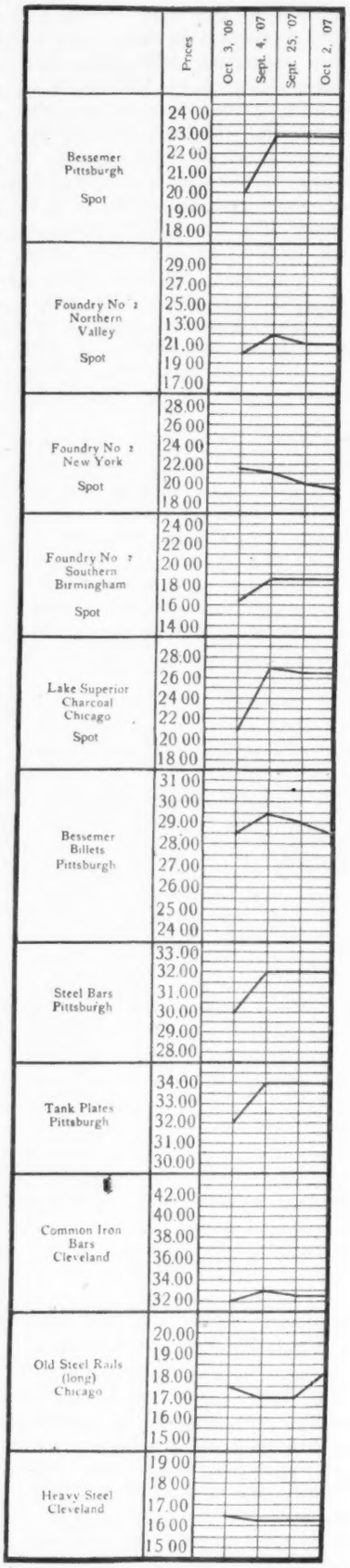
CHICAGO.

Oct. 1.

The metal market, particularly in copper, presents a much brighter aspect this week. A number of sales of good sized amounts of copper for future delivery are reported. A marked change in the attitude of buyers of this metal, who for a number of weeks have bought in lots of a few hundred pounds, is noted and a continuance of the freer buying is anticipated. We have revised our prices and on carload lots unless otherwise stated, quote as follows: Lake copper, 16½ to 17½c; casting, 15¾c to 16½c. Pig tin, 39c to 39½c; spelter, 5½c. Pig lead, desilverized, 5c to 5.10c in 50-ton lots; corroding, 5.25c to 5.35c in 50-ton lots; carlots 2¼c per 100 pounds higher. Sheet zinc, $7.50 list f. o. b. LaSalle in carlots of 600-pound casks. Cooksons antimony, 14c to 15c; other grades, 12½c to 13c.

The market on old metals is not stronger this week, but prices have been stiffened in a number of instances because of a shortage in supply. Smelters and dealers are offering the following prices: Copper wire, 13c; heavy copper, 13c; light copper, 12c; heavy red brass, 12c; heavy yellow brass, 9c; light brass, 7¼c to 7½c; No. 1 red brass borings, 9c; No. 1 yellow brass borings, 7¾c to 8c; brass clippings, 9c; tea lead, 3¼c; zinc scrap, 3¾c; zinc clippings, 3½c; tin foil, 26c; tin pipe, 31c; pewter, 21c; aluminum clippings 29c; aluminum cast scrap, 26c; electrotype plates free from wood, 4½c; electrotype dross, 2¼c; stereotype plate, 5c; stereotype dross, 2¾c; prime slab zinc dross, $72 per ton.

PRICE CHART.



RATHER GLOOMY.

(Continued from page 519.)

clining to speculate for future requirements. There is really a good volume of trade, and the facts hardly warrant the prevailing nervousness.

Trade is being a good deal disturbed by labor troubles from which up to the present, we have been remarkably free. There are serious fears of a railway strike, provoked by the refusal of the railway companies to advance wages, but still more by their determination not to recognize the officials of the Amalgamated Society of Railway Servants in labor negotiations. It seems likely that the fight, if it comes off, will be concentrated on this question.

A small storm has been evoked here owing to the fact that an American tender has been accepted for 100,000 pairs of horse shoes for the cavalry of the British army. The successful company is the Bryden Horse Shoe Co. It has now been discovered that a large quantity of nails are being brought over from Germany for the fixing of the shoes. They were contained in sacks addressed to the Royal Arsenal at Woolwich, and the labels read: "Ex Grebe, Rotterdam, made in Germany," Naturally, the tariff reformers have made the most of the transaction, but Mr. Haldane adheres to his determination to save the taxpayers money as long as he can buy 15 per cent cheaper abroad.

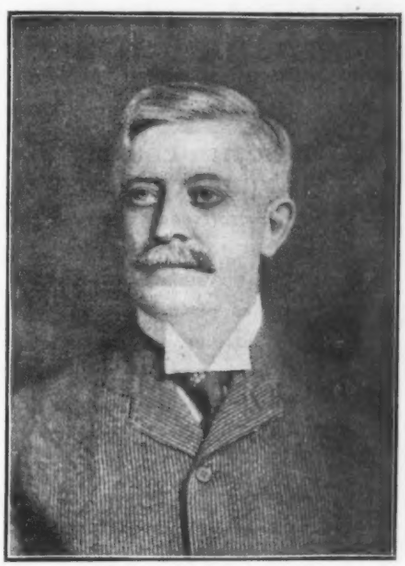
THE MILWAUKEE TRADE SCHOOL.

Milwaukee, Wis., Sept. 27.—The Trade School committee of the Milwaukee school board has confirmed the rules for conducting the school which were tentatively outlined some time ago. The school is now fully introduced under municipal management. Ample funds have been provided by an act of the legislature, and the institution will within a few years probably be housed in a building of its own.

The establishment of this school has attracted national attention. In Milwaukee credit is frankly given to Frederick W. Sivyer, president of the Northwestern Malleable Iron Co., as the man to whose interest and support the successful inauguration of this departure in educational work here is primarily due. Mr. Sivyer, who has been a member of the Milwaukee school board, recently made a gift of the Albert Memorial Hall, a music hall for the Milwaukee-Dewner college, a woman's educational college located in Milwaukee. He has been active in a public-spirited way in many other important movements.

The school will be managed by a committee of manufacturers, all of whose acts will be passed upon by the school board of the city. It has been decided to continue the charge of $10 a month for non-resident pupils and those over 20 years of age; but the charge for evening pupils of this class was reduced from $5 to $3 a month. Day pupils receiving free tuition are to pay $2 a month for materials and night pupils 50 cents a month. For other pupils the tuition charge pays for the materials used. Plumbing, gasfitting, patternmaking, toolmaking and the machinist's craft are some of the crafts taught.

Mr. Sivyer was president of the Merchants' and Manufacturers' Association when, in 1904, he suggested the establishment of the school. The secretary



FRED'K W. SIVYER.

of this association has received a letter from Congressman Charles R. Davis of Minnesota, asking the association, as the parent of the trade schools of the country identified with city schools, for its support in behalf of legislation which he proposes, and which provides for an annual appropriation for industrial education in high schools of the country.

RAIL REPORT NOT READY.

New York, Oct. 1.—The sub-committee on new rail specifications has submitted its report to the general committee, which is likely to spend considerable time in considering it before any action is announced. No information is procurable as to the nature of the recommendations. Press reports are branded as wild guesses.

IMMENSE PLANT

Will be Built by the General Electric Co. at Erie—Plans for Foundries.

A new plant, which ultimately promises to surpass in size its present mammoth works at Schenectady, N. Y., will be built by the General Electric Co. on a site of 700 acres recently acquired near Erie, Pa. The property has a frontage on Lake Erie of more than a mile and excellent transportation facilities are provided by the Lake Shore, Nickel Plate and Pennsylvania railroads.

Plans are now being prepared for malleable and steel foundries, and machine and pattern shops, and the first ground will be broken early in 1908. Initial operations will be devoted exclusively to the building of electric locomotives, the demand for which is enormous, and the Schenectady plant is unable to fill the orders already in hand. Almost from the beginning the company will employ 5,000 men and work will ultimately be provided for no less than 20,000.

A pattern shop is now being operated at Erie and castings for shipment to Schenectady are being made in several of the local gray iron foundries.

The selection of Erie was undoubtedly influenced by the fact that it is one of the greatest of the competitive raw material centers in the country. With a haul of less than 100 miles, iron can be had from the Mahoning and Shenango valleys, Cleveland and Buffalo, and bottom quotations generally prevail. The cost of shipping coal and coke from the Pennsylvania fields is likewise low and these advantages were important factors that have figured in the development of Erie as a foundry center.

The labor market is also one of the best in the country, no strikes of importance having occurred for several years.

PLANT IS DAMAGED.

Fire which broke out the night of Sept. 30 at the plant of the Lackawanna Steel Co., Buffalo, for a time threatened to envelop the entire works. The buildings destroyed were used as car shops by the South Buffalo railway, which is controlled by the Lackawanna Steel Co. Manager Sheldon states that the loss is about $250,000, and that the inconvenience in the operation of the plant, caused by the conflagration, will be very great. The loss is fully covered by insurance.

THE IRON TRADE REVIEW

Devoted to Iron and Steel Manufacture and to the Machinery, Metal-Working and Foundry Trades

PUBLISHED EVERY THURSDAY BY
THE PENTON PUBLISHING CO.
CLEVELAND.

BUFFALO.....932 Ellicott Sq.
CHICAGO.....1362 Monadnock Blk.
CINCINNATI.....First National Bank Bldg.
NEW YORK.....1005 West Street Bldg.
PITTSBURG.....521 Park Bldg.
DULUTH.....411 Providence Bldg.

Subscription, United States and Mexico, $3.00 per annum. To Canada and Foreign Countries, $4.50. Advertising Rates Furnished on Application.

Change of advertising copy must reach this office ten days preceding date of publication.

The Cleveland News Co., will supply THE IRON TRADE REVIEW through the regular channels of the American News Co.

European Agents: The International News Company, Breams Building, Chancery Lane, London, E. C., England.

ENTERED AT THE POST OFFICE AT CLEVELAND, AS SECOND CLASS MATTER.

PRINTED IN AN OPEN SHOP

October 3, 1907.

THE BESSEMER ORE SHORTAGE.

Last May, when pig iron prices were at their highest, No. 2 foundry pig iron in the central west was selling above Bessemer pig iron to the extent of 50 cents a ton for forward delivery, and $1 to $2 a ton for prompt delivery. At the present time, foundry pig iron for such deliveries as are being considered is $1.50 to $2 a ton under Bessemer pig.

The difference is not due to a change in the demand. The demand for Bessemer pig has been good, but it has not been abnormal. In the past two months the sales of Bessemer pig iron have been almost nothing. Sales of foundry pig, while light, have not been as light relatively as Bessemer sales. Consumption of foundry pig has been excellent, and the market has not been depressed by resale iron.

The cause of this change of more than $2 a ton in the relative selling prices of the two grades has been due in no degree to any change in the relative demand, but has resulted wholly from a change in the supply of ore. The ores this season have furnished a keen disappointment all along the line, and the scarcity of ores of good Bessemer grade is greater than is generally admitted. It has affected practically all consumers, from the largest down to the smallest. Had there not been a change in the prospect, whereby the trade expects to get along with a smaller season total than was at first anticipated, the shortage of Bessemer grades would be still more serious matter.

As it is, if there is a regulated movement towards a curtailment of steel production, it will be Bessemer rather than open-hearth plants which will be closed, and it is likely that the makers of Bessemer steel rails will be found in a much firmer attitude on the subject of price than was expected when the subject was first opened.

THE SMOOTH COURSE OF LIQUIDATION.

A month ago reference was made in this department to the fact that the whole industrial system was undergoing a process of purification. It was a case of liquidation in securities, in commodities and in labor. That liquidation has proceeded smoothly despite the rapidity of its movement. In securities the decline has sometimes been rapid, but it is a stretch to regard it in any degree as partaking of the nature of a panic. In commodities there has been drastic curtailment of stocks on the part of many jobbers, yet producers have felt the effect but slightly, and the liquidation has proceeded much more smoothly than could possibly have been anticipated. In labor the liquidation, which will end in much better service proportionate to wages received, has but commenced.

Were this a "Roosevelt panic" as charged in some quarters, particularly journals representative of Wall street thought, or what Wall street desires the country to assume that it thinks, the liquidation would not have proceeded in this orderly way. Already the sober thought of the country is crystallizing on the idea that Mr. Roosevelt is constructive and not destructive.

What has been destroyed in this process of purification has not been destroyed by Mr. Roosevelt. The idea had been adopted without sufficient thought that the great increase in gold production in recent years meant an equivalent increase to the volume of gold used as money; it has lately been shown that less than half the gold production of the past ten years can be found in the increase in the visible supply. It was not Mr. Roosevelt who destroyed the mistaken idea. Business interests had assumed that the railroads would have to continue buying equipment and other material on the previous lavish scale, but the railroads are finding that they will not need to, but can get better results from the material they already have; if so, Mr. Roosevelt cannot be blamed with having destroyed railroad buying. It is being found that, contrary to the old idea, the western agricultural interests do not need to spend or otherwise distribute in the east all the money they receive for crops; they are sufficiently debt-free and prosperous to keep a large part of their money; certainly Mr. Roosevelt is not responsible for this change. These three exploded ideas were not destroyed by Mr. Roosevelt, and yet their demolition is responsible very largely for the change in the industrial situation.

That the liquidation in the iron and steel trade is proceeding smoothly and orderly is shown by the equanimity with which producers regard the prospective curtailment in output. Plans are being made leisurely for closing mills in rotation, and making repairs which have long been urgently needed. These plants have been under uninterrupted pressure for nearly three years, only the most absolutely necessary repairs having been made in this period, and no general overhauling having been attempted. Many blast furnaces will likewise be closed. At a recent meeting of the Eastern Pig Iron Association, a number of the members reported that their fur-

naces would soon be blown out. They needed repairs before this, but are being kept in operation until contracts are filled, and their being run at this disadvantage will considerably increase the time repairs will require.

In the smooth and orderly way in which a slowing down is being prepared for in the iron and steel trade lies the most hopeful sign for the future. Both producer and consumer have been fully alive to the possibilities and are preparing to meet the worst that can come. What is guarded against is half conquered and there is thus the best reason to believe that it is not the worst that will come. Usually it is the unexpected which comes, and if it be so in this case, then the result will be the unexpectedly good and not the unexpectedly bad.

Throughout all the predictions which have been made as to poorer business in 1908 has run the strain that the depression is to be a temporary one, and that there is a foundation for several years of prosperity after this depression has been met. Men are already beginning to think of what they will do afterwards, and once the full measure of the prospective lull is taken, and that will probably be very soon, industry will be ready for the inception of the revival. Granting that the liquidation now progressing so favorably must run its course smoothly and quickly, the signs of the times are of the most hopeful nature for the not distant future. If this were a "Roosevelt panic," no hopeful view could be taken, at a time when Mr. Roosevelt has seventeen months yet to serve, and when there is no prospect that his successor will not be in measureable accord with his views, but there is no warrant for so regarding the present period of liquidation.

THE SHAME OF THE NAVY.

Nothing that the American navy has done since the Spanish war has aroused so much comment, favorable and otherwise, as the decision to send a large fleet to the Pacific ocean. While differing as to the wisdom of making this demonstration, all Americans will agree that if the ships go, they ought to make the trip in a manner which cannot be criticised by any other power. The management should be perfect and demonstrate that the naval officials are not only capable of handling ships when engaged in action in time of war, but also in providing for making long trips without being embarrassed by lack of coal or other supplies. The management of the army during the war with Spain was, in some respects, highly disgraceful, but the navy escaped such criticisms as were showered upon Secretary Alger and others connected with the war department. Whether the navy would have stood a test with some greater power than Spain, is another question. While it is important to build new ships, it is equally important to know how to manage the ships we have, and in dispatching a fleet of war ships to the Pacific coast the most vital question now is whether the coal for the war ships is to be taken by American or foreign vessels.

Protests have been made against the proposed shipping of American coal for Ameriacn vessels in foreign bottoms. W. L. Martin, one of the representatives of American shipping interests, has filed a statement at the navy department in which he says that the proposed award to foreign bottoms would be a great wrong to American labor. He asserts that the proposed action would be a violation of the law of the United States, and that the use of foreign ships for this national service because of the cheaper wage rate at which they were built is a complete betrayal of the protective policy by a national administration solemnly pledged to maintain it. Mr. Martin adds:

"The spectacle of our battle ship fleet escorted, fed and nursed around the coast of South America by an attendant fleet of British and other foreign colliers will make an utter farce of what was intended to be an impressive demonstration and will bring down upon our flag and our government the sardonic laughter of the world."

Mr. Martin is entirely right, and all Americans will deplore the fact that the navy department considers it necessary to call upon foreign ships. If the United States had an adequate merchant marine such as would have been created by the passage of a shipping bill, there could not now be any question of how coal for naval vessels would be carried. The danger is, the American people will wake up too late to find themselves engaged in a war with one of the great powers without having auxiliary fleets to insure victory for the navy.

LARGE GAIN

In Profits Made By Virginia Iron, Coal & Coke Co.

A large percentage of increase, both in gross receipts and surplus, is shown by the Virginia Iron, Coal & Coke Co. in its annual report for the year ended June 30, 1907. The income account compares as follows:

	1907.	1906.	1905.
Gross receipts..	$6,650,406	$5,088,293	$3,317,562
Expenses	4,665,490	4,529,535	2,855,520
Net	$ 984,916	$ 558,758	$ 462,042
Other income..	82,452	22,078	54,471
Total income...	$1,067,368	$ 580,836	$ 516,513
Chgs., taxes, etc.	407,361	420,392	426,833
Surplus	$ 660,007	$ 160,444	$ 89,680

The balance sheet of the company as of June 30, shows total assets of $17,021,565, against $17,042,270 in 1906, $17,937,740 in 1905, and $17,389,325 in 1904. The company has granted a stock dividend of 5 per cent, payable Oct. 1. On that date $432,080 additional stock, which will go to stockholders of record on Sept. 2, will be issued.

Chattanooga's Claims.—The city of Chattanooga is making an earnest effort to have the Southern Supply and Machinery Dealers' Association, the National Supply and Machinery Dealers' Association and the American Supply and Manufacturers' Association hold their next joint meeting in that city. Chattanooga is well located for membership of these organizations. When the American Society of Mechanical Engineers met there in May, 1906, the meeting was in every way successful and delightful. It seems probable that when the claims of the different cities are considered for the convention, Chattanooga stands a good chance to win.

NO DISHONESTY

DISCOVERED AT QUEBEC BRIDGE INVESTIGATION.

Important Decision Concerning Alien Labor—Manufacturers Dissatisfied with the Canadian Tariff.

(Special Correspondence.)

Toronto, Canada, Sept. 30.—At the Quebec bridge disaster investigation, on Sept. 23, E. A. Hoare, the Quebec Bridge Co. engineer, who prepared outline plans for the structure, gave his evidence. He stated that on Aug. 27 his attention was called to chord No. 9 on the anchor arm. Mr. McLure reported to him that chord A9L showed defects in all four of the members. He (Mr. Hoare) directed Mr. Kincade to make a thorough check, taking levels, and go to New York and Phoenixville with sketches of the defect. McLure informed him that Foreman Yenser would not move the traveler out, to which he replied "That is all right," but it was afterwards moved out, Yenser believing it safe to do so. Engineer Birks was of opinion that repairs were necessary. He reported that the chords were badly bent in the different members and expresesd the opinion that some of them were in that condition before being placed in the bridge. The inquiry at Quebec was finished on Sept. 24, after two weeks' work. The commission proceeded to Ottawa to examine Collingwood Schreiber, consulting engineer of the Railway department and other officials, the plans of the bridge having been approved by that department. Henry Holgate, chairman of the commission, on Sept. 27 gave out the following statement as to the results of the investigation so far: "As far as we have been able to find out, there has been the greatest care taken all along the line to insure the safety and permanency of the structure. The specifications and plans were prepared by the best engineers on the continent, and wonderful care and accuracy have been shown throughout. We have found absolutely no trace of dishonesty or graft in connection with the construction of the bridge. It seems to be really a case of the best engineering brains on the continent, and the best engineering methods being on trial. In so far as the government's connection with the enterprise is concerned, everything seems to be quite regular, and what should have been done has been done."

Important Labor Decision.

Judge Choquet has rendered an important judgment at Montreal, in connection with two cases brought against the Dominion Car & Foundry Co., Ltd., under the alien labor act. According to the act the importation of any alien to perform labor of any kind under contract is punishable by fine of not more than $1,000. Prosecutions were instituted by the National Trades and Labor Council. The company pleaded in defense that the establishment of a plant for building steel cars was a new industry in Canada, and that as skilled labor for that purpose could not be obtained in the country, the company was exempt from the provisions of the act. It had advertised in the Montreal papers for hammer riveters, and made inquiries to obtain skilled labor for that purpose, but without avail. The judge sustained this view and dismissed the cases, holding that the application of the act could not be pressed so far as to cripple a new industry, and that it was not known that any skilled Canadian workmen had been deprived of employment.

The Dominion Coal Co. Case.

The directors of the Dominion Iron & Steel Co., of Sydney, N. S., on Sept. 23, issued a supplementary report showing the damages claimed from the Dominion Coal Co. under the recent judgment and the earnings for the first quarter of their fiscal year, terminating Aug. 31. The gross earnings for the three months from June to August, inclusive, were $705,347, and the available surplus, after deducting interest and other fixed charges, $453,333. This is calculated on the basis of charging the coal used at the contract price of $1.28, the extra cost amounting for those three months to $333,412, being charged to the Dominion Coal Co. as being recoverable from it under the judgment.

Canadian Manufacturers Convene.

The annual convention of the Canadian Manufacturers' Association was held at the King Edward Hotel, Toronto, this week, commencing on Sept. 24, there being some 350 delegates in attendance. The chair was occupied by President H. Cockshutt, of the Cockshutt Plow Co., Brantford, Ont. His opening address dealt mainly with the tariff question. He asserted that the situation was unsatisfactory, as, notwithstanding the great expansion of manufacturing industry, their share in the home market showed no substantial increase, showing by the census figures that the home consumption of manufactured goods in 1901 was approximately $539,953,002, of which Canadian manufacturers supplied $401,221,709, or 74 per cent. By 1905 home consumption had increased to $792,930,286, of which Canadian manufacturers supplied $595,830,253, or roughly 75 per cent. Relatively speaking, therefore, the manufacturers of Canada were in the same position. The export trade for 1907 showed an actual decrease as compared with 1906. Imports had been increasing rapidly and the 12 months ending with June showed an adverse balance of trade of $104,476,142. He condemned the tariff as inadequate. Dealing with the labor question, he censured the policy of the government in refusing to encourage the immigration of skilled artisans. Mr. Cockshutt's address practically struck the keynote of the subsequent discussions of the convention on these questions. The report of the tariff committee presented by W. K. George, of Toronto, condemned the revision of the tariff as entirely unsatisfactory and declared the aims of the association to be to secure a tariff which would furnish relief to industries now suffering from unequal competition, and which would not only encourage a reasonable development of industries already in operation, but serve as an incentive to the establishment of new industries. The report was adopted. A. S. Rogers submitted the report of the parliamentary commitee recommending a resolution urging the Dominion government to encourage the immigration of skilled artisans, which was adopted. In the course of the discussion, there were many strong expressions as regards the concession made by the government in this matter and in other respects to the demands of organized labor.

MINORITY MOVE FAILS.

New York, Oct. 2.—The minority interest in the American Steel Foundries could muster only about one-fourth of votes cast at the annual meeting yesterday. Judge Gary presided. His suggestion that a small committee be named to confer with the directors on the dividend question and to employ auditors, if necessary, was adopted, after he had explained the bonus plan with officials of the company. W. W. Butler, E. F. Goltra, W. P. Sargent, Arthur J. Eddy and Morris Backman were elected directors, Backman being the only new director.

NEW BUSINESS

In Cincinnati Machinery Market Improved—Heavy September Output.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg.,
Cincinnati, Sept. 30.

In some respects the month of September has been a more satisfactory one than August in the machinery trade. In the matter of output it has been a heavy month in the machine tool line. In respect to new business, it has been somewhat better. The inquiry and correspondence have been more encouraging. Cancellations have been less frequent and covered smaller orders. The situation seems to have settled during this month to a more clearly defined position and manufacturers have less doubt as to the outlook than they had a month ago.

The corn crop is now practically past the stage where it can be greatly harmed by frost, and business interests are regarding the general conditions as assuming a normal position. This same attitude is accepted in the machinery lines.

Under these circumstances more attention is being given to the selling end of the machinery business and where efforts in this direction have been somewhat lax during the period of enormous demand when calls for machine tools were beyond the capacity of the shops, they are now being resumed.

As we enter the last quarter of the year, it is noticeable that a peculiar tendency arises to defer making changes and purchases until after the first of the year has been reached. Already this feature of business custom is becoming an element. Considerable of expected development is being suspended for this reason and on the other hand work is being prosecuted to effect completion by or before that time.

Values in the iron and steel lines for 1908 are not clearly foreshadowed this year and but little pig iron has been sold for 1908 delivery. Machine tool makers are inclined to draw freely on their stocks of castings, believing that they can be replaced later on at lower prices under sliding scale contracts or on a flat basis. A number of foundries are seeking business, as they feel the force of the liberal use of stocks of castings and a falling off in new specifications accordingly. This shrinkage in new foundry business should not, therefore, be misunderstood. Castings are being used rapidly and will be replaced. It is simply the result of the settling down of the pig iron market that has induced the machinery manufacturer to defer placing specifications for all castings as fast as used and keeping up his stocks.

The American Tool Works Co. has made several additions in the way of tools to its shop equipment.

The Mueller Machine Tool Co. is now in its new shop on Colerian avenue.

VERY QUIET MONTH

In the Machine Tool Business in New York—Deliveries Are Improved.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St.,
New York, Oct. 1.

Yesterday marked the close of one of the most quiet months of the year in the local machine tool trade. Some concerns, in fact, find that it was even less active than August when the vacation season was on in full force. Building is almost at a standstill and consequently there is little call for new equipment, while replacement business is of very limited volume. The railroads are still holding off, those inquiries which have been sent out in the last fortnight being for only a few scattered tools. It is reported that the Baltimore & Ohio has asked tenders on a limited list. A few crane inquiries are being figured on and there is a very fair business in metal saws. Deliveries on most lines of machine tools have improved to such an extent that only a few weeks are now required to secure machines of odd lengths or unusual designs.

The Universal Grate Bar Co., with offices at 95 Liberty street, New York, in charge of George N. Knox, has taken the selling agency for George H. Thacher & Co., Albany, manufacturing the Coe combustion system and the Coe grate. This system has recently been installed in a number of large eastern plants and other important installations are in prospect.

A. P. Whitteman, of A. P. Whitteman & Co., 1223 Spring street, Philadelphia, has acquired a majority of stock in the Chester Forging & Engineering Co., Chester, Pa., and has been made president. S. S. Tompkins is secretary and treasurer and W. H. Arnold general manager, both these officials having formerly been connected with the company. The plant of the American Conduit Co., with about four acres of ground, has been acquired and a specialty will be made of finished forgings, particularly of finished crank shafts.

EXTREME PENALTY

Given Union Business Agent for Intimidation of Employes.

Upon conviction on four of the five counts charging intimidation of its employes by the McLagon Foundry Co., New Haven, Conn., Frank McGee, of Worcester, Mass., the business agent for New England of the Iron Molders' Union of North America, was given the maximum penalty of two years in jail and a fine of $400 by Judge Tyner, of the police court of New Haven, recently. A penalty of six months in jail and a $100 fine was imposed on each count. In commenting upon the relations of capital and labor in his decision, Judge Tyner said in part.

I suppose we shall continue to have these affairs with business enterprises on one side and labor on the other in some sort of strife. We always have had and probably always will. In my opinion it is not unlawful for a dissatisfied workman to strike and to leave the shop where he is employed.

It is not unlawful for a business enterprise which has grown up at the expense of the brains and energy of one or a dozen individuals to discharge an employe if it wants to. It only becomes unlawful when the men who leave the employ of such an enterprise interfere with the rights of the firm or of those who enter the employ of the firm. It seems to me that it would be wise for employes who have gone out because of such dissatisfaction over wages or hours, etc., to seek employment somewhere else where they can get the wages and the hours they want.

It becomes unlawful when men gather around a shop, congregating in groups and interfering with the legitimate business rights of a firm or corporation which it has perhaps taken years of work to build up. The labor laws were made to fit both the rich and the poor, both capital and labor, and I think that Connecticut has gone even further in the protection of business enterprises than any of the states referred to in the arguments. I believe that picketing, as was quoted from one of the references, is not unlawful in its purpose if merely to gain information of the progress of the strike or of governing conditions, and if the pickets do not interfere with the employes.

An employer should be protected in his desire to run his own business in his own way and should not be placed in a position to be told how to run it by others who have had no part in its building up. The men who gave up their positions at the McLagon foundry had no more right to re-employment than I or the counsel here. They gave up their jobs of their own volition.

Counsel for McGee immediately filed notices of appeal and a bond of $4,000 was fixed by the court pending other legal action.

DEATH OF MARTIN FOX.

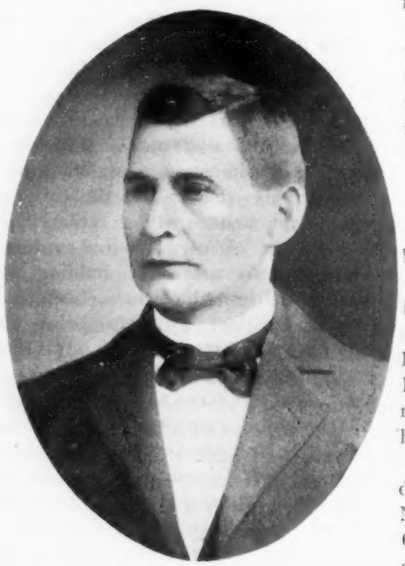
After a number of years of illness, accompanied by intense suffering due to inflammatory rheumatism and lung disease, Martin Fox, formerly president of the Iron Molders' Union of North America, died at noon, Sept. 28, at his home in Cincinnati. The possibility that the condition of his health might compel him to resign the presidency of the union was discussed for two years prior to July, 1903, when the resignation was formally presented to the executive board of the union, and it took effect shortly thereafter. This action was taken in the face of strong urging from his associates to continue, added to the assurance that such help as he might need would be provided, to relieve him of the brunt of the president's burdens. For a time Mr. Fox assisted in the care of a number of matters which were then pressing upon the attention of his official associates, and he continued to serve in an advisory capacity up to the time of his death.

Martin Fox was born in Cincinnati in 1848. He served an apprenticeship to iron molding in Resor's foundry and worked continuously at that trade until he became officially connected with the Iron Molders' Union of North America. In 1880, P. F. Fitzpatrick, president of the union, appointed Mr. Fox as his clerk and in 1886 the union created the office of secretary, electing Mr. Fox to fill the position. His executive ability soon made itself felt and it was no surprise when, on Mr. Fitzpatrick's retirement in 1890, the Detroit convention of the Iron Molders' Union made Martin Fox its official head.

Always a friend of peace, one of the first acts of Mr. Fox as president was to enter into negotiations with the Stove Founders' National Defense Association with a view to ending the interminable conflicts between the organized iron molders and the stove manufacturers, which had sadly handicapped the stove manufacturing industry during the eighties. In these efforts he had the hearty cooperation of Henry Cribben, then president of the defense association, with the result that in 1891 the foundation of what are known as the conference agreements were laid at a meeting of representatives of the two organizations in Chicago. Under this arrangement there must be neither a strike nor a lockout until investigation has been made by impartial representatives of both associations.

Conciliation, as applied to industrial disputes, was not so much talked of in 1891 as it is today and in its advocacy Mr. Fox had to face the bitter opposition and harsh criticism of many members of his union. But, despite all opposition, he succeeded in bringing about the ratification of what is conceded to be the first undertaking in the United States between associated manufacturers and organized workmen, whereby both parties were pledged to arbitrate their differences

In 1895, 1899 and 1902 he was successively re-elected to the presidency of the Iron Molders' Union. During these years he not only piloted it through one of the most trying periods of its history and made it one of the most substantial trade unions in the country, but won for himself and his organization the respect of American foundrymen. Shortly after the organization of the National Founders' Association, it will be remembered, Mr. Fox made advances to the representatives of that association with a view to still further applying the principles of peace and conciliation. The New York agreement of 1899 was the result. Not only on the question of arbitration of disputes did Mr. Fox take advanced ground, but his attitude upon the molding machine question, apprentice ratio and other vital issues marked him as an advanced thinker in the labor world, and, though conservative in many respects, he was progressive and broad-minded when considering the problems which confront American industries.



MARTIN FOX.

Fidelity to principle and to obligation, firmness, and a high sense of justice marked Mr. Fox's official career. Though one of the strongest characters among American trade union leaders, his retiring disposition made him averse to notoriety. He devoted himself to the Iron Molders' Union and never sought in a wider constituency to command applause or attract admiration. Not the least of his powers was his ability to secure the willing, loyal support of his associates, this contributing in no small degree to the success of his administration.

Mr. Fox was well known among the foundrymen of the United States and Canada and was held in very high esteem by all who had any dealings with him. His name was universally regarded as a symbol of good faith and fairness and it may well be said that the whole foundry industry regretted the necessity of his premature retirement from active leadership and now mourn his death.

PERSONALS.

E. W. Buechling, of Pittsburg, has been appointed to the new office of assistant manager of sales of the Pittsburg Automatic Vise & Tool Co.

Samuel Davis, superintendent of Lock Ridge furnaces for the Thomas Iron Co., for a number of years, has resigned and will retire, making his home at Catasauqua, Pa.

A. L. Davis, assistant to the president of the American Bridge Co., New York, spent several days in Cleveland last week as a guest of Local Manager E. M. Sprague.

M. H. Stimson has been made manager of the newly organized Vulcan Foundry Co., Grand Rapids, Mich. Mr. Stimson has been connected with the American Radiator Co., Detroit.

C. H. Zehnder, president of the Wilmington Iron Co., Wilmington, Del., and vice president of the Scranton Bolt & Nut Co., Scranton, Pa., has sailed for Europe for a two months' trip.

Frederick W. Sivyer, president Northwestern Malleable Iron Co., Milwaukee, Wis., has returned from his trip abroad. During his absence he toured through England and Scotland in an automobile.

J. W. Lawler has been appointed superintendent of the iron foundry department of the St. Charles plant of the American Car & Foundry Co. Mr. Lawler is the oldest son of James G. Lawler, superintendent of the St. Charles Car Works, St. Charles, Mo., and was formerly superintendent of the foundry department of the Madison Car Works.

THE KRUPP WORKS IN GERMANY

A Description of a Group of Plants Comprising Blast Furnaces, Steel Mills, Gun and Armor Plate Shops

BY J. B. VAN BRUSSEL

The Krupp Works, like most of our great industrial establishments, started from humble beginnings; it increased until now it is the largest enterprise of its kind of the old world. The share capital of the firm amounts to $45,000,000, and its direction is entrusted to a board of 11 managers. The number of people employed in the establishment Jan. 1, 1907, was over 65,000, including about 5,700 engineers and clerks.

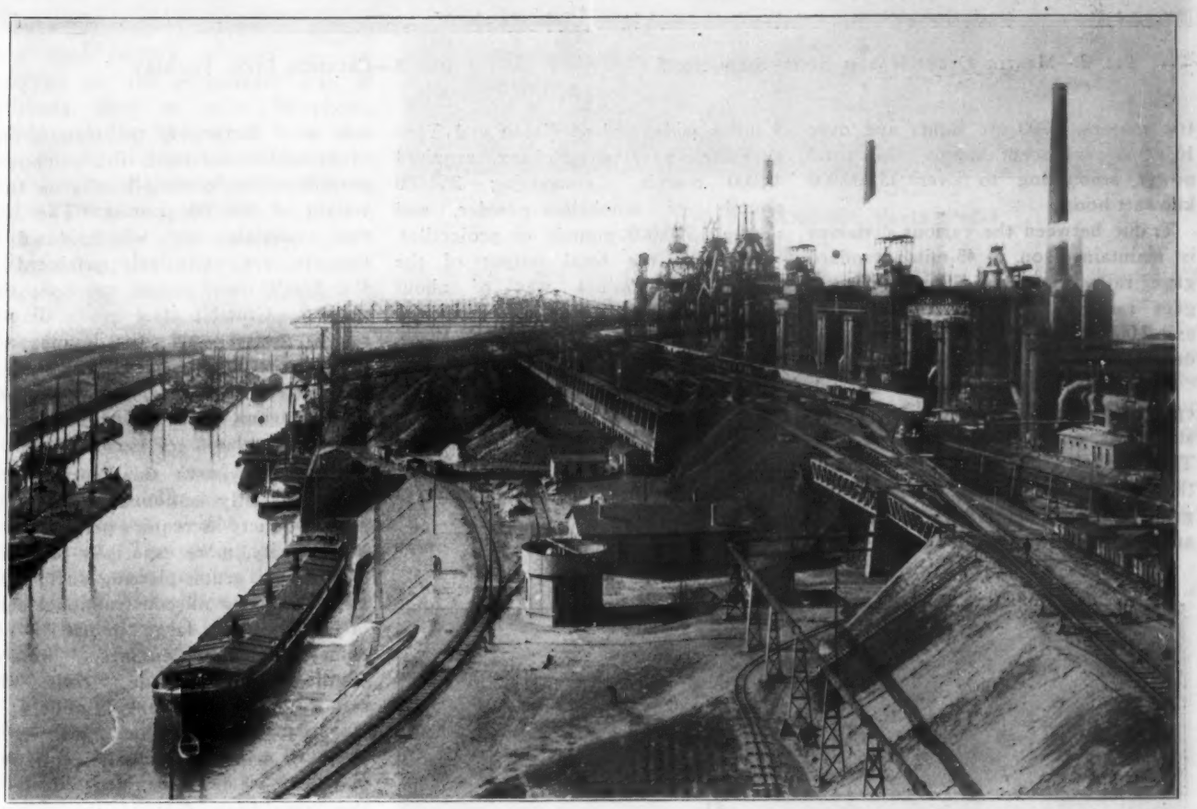


FIG. 1.—THE BLAST FURNACE PLANT AT FRIEDRICH-ALFRED HUTTE.

The Essen Works.

Into the original Krupp cast steel works at Essen on the Ruhr have become incorporated in the course of years a number of other establishments in various parts of Germany, principally the cast steel works at Annen in Westphalia, the Gruson works, near Magdeburg, and the Germaniawerft at Kiel on the Baltic. A blast furnace plant on the Rhine nearly opposite the town of Duisburg, which was originally built and administered by the Essen works, has become so important, that it now has its own management, so that the Krupp establishment may now be said to be composed of five different groups of works.

The cast steel works at Essen employ nearly 36,000 persons, and comprises about 60 departments. With the workmen's settlement it occupies an area of about 1,000 acres. These various departments included on January 1, 1907, 6,500 machine tools and other workshop machines; 21 rolling mills, 155 steam and 21 power hammers of aggregate power of 568,000 pounds; 74 hydraulic presses, among them two 7,000-ton bending presses, one 5,000-ton and one 2,000-ton forging presses, 382 stationary and locomobile steam boilers; 539 steam engines, ranging from 2 to 3,500 horsepower, aggregating a total of 59,100 horsepower; 1,361 electric motors of 20,226 aggregate horsepower; 725 cranes of power varying between 800 and 330,000 pounds, having a total lifting capacity of 15,400,000 pounds.

Raw Material Consumption.

The coal and coke consumption of all establishments in 1906 amounted to 2,361,425 tons. For the water supply, there are four independent installations, supplying yearly about 45,865,000 gallons of water. The electrical equipment, including three power plants with three engine rooms, five transformers and two substations, fed in 1906, beside the above named elec-

FIG. 2.—MARTIN OPEN-HEARTH STEEL SHOP NO. 5.

FIG. 3.—CRUCIBLE STEEL FOUNDRY.

tric motors, 1,700 arc lights and over 16,000 incandescent lamps, the total power amounting to over 13,000,000 kilowatt-hours.

Traffic between the various divisions is maintained on a 45-mile standard gage railway and a 35-mile narrow gage railway by 46 locomotives and and 2,066 cars. The daily arrivals and departures require over 50 trains.

The establishments include 21 telegraphic stations with 37 Morse instruments, and about 50 miles of wire. The average ballistic experiments and the test firing at the three proving grounds at Meppen, which alone cover an area over 16 miles long and nearly 3 miles wide, and at Essen and Tangerhutte, near Magdeburg required 47,000 rounds, consuming 264,000 pounds of smokeless powder, and nearly 1,700,000 pounds of projectiles.

In 1906, the total output of the Krupp coal mines was of about 2,204,272 tons, and the pits employed over 9,300 people. Besides these, Krupp has shares in foreign mines. The iron mines comprise 673 concessions of which 37 are being exploited, they employ 3,914 men. The total output of the mines in Germany alone in 1905 amounted to 675,682 tons of iron ore.

The oldest specialty of the Essen cast steel factory is the manufacture of crucible cast steel, the equipment permitting the casting blocks up to a weight of 187,000 pounds. The best raw materials only, which, down to the ore, are exclusively produced in the firm's own plants, enter in this process. Crucible steel excels all others in purity, and the ingots and blooms produced from it, even up to the heaviest weights, are absolutely homogeneous, close-grained, and uniform throughout.

The factory uses this crucible cast steel especially in connection with all such products as require perfect working security, more especially for guns, small arms, armor-piercing shells, etc., and further for all constructional parts of locomotives, large industrial machines, marine engines, winding engines, and large rolls for armor plate rolling mills. It is also used for all such parts in which a minimum of wear and tear is desirable, and which, at the same time, demand the greatest possible safety against breakage, such as tires and axles for locomotives, tenders and cars; for hardened rolls for gold and silver; for dies of various kinds, etc.

The open hearth steel produced in the works is used for the various requirements of ship building, as plates and angles, for the armoring of war vessels, for projectiles, gun carriage parts, boiler plates, railway car axles and tires, springs, wire, and the like. An extensive branch of the steel works activity consists in the manufacture of steel castings from crucible and open hearth steel. In this line of steel castings the works principally turns out railway switches and points, wheels for locomotives and wagons, wheel-

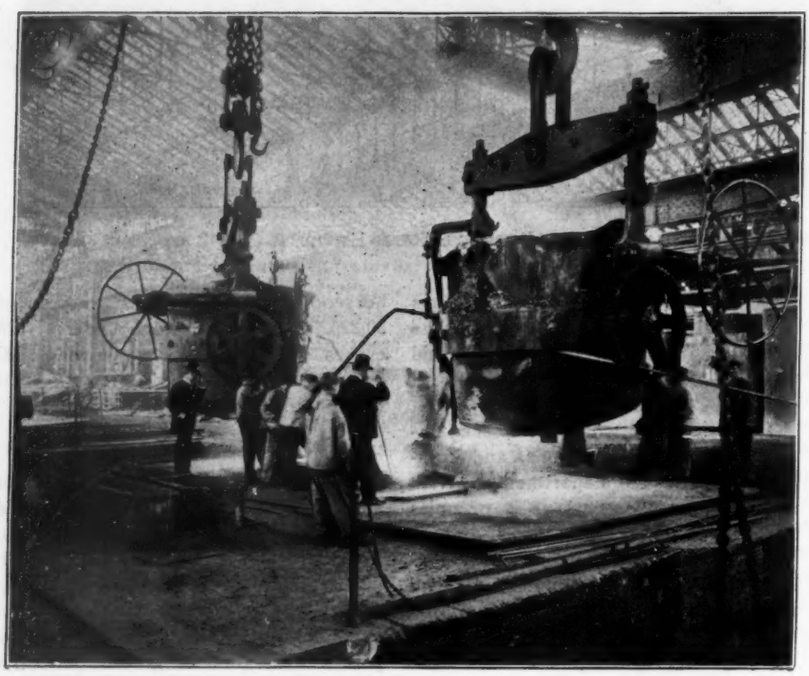


FIG. 4.—CASTING A HEAVY INGOT FROM TWO 40-TON LADLES.

centers, parts of machinery, shipbuilding supplies, such as stems, rudders and screws, castings for constructional purpose and dynamos, and any part of difficult shape and of any weight required.

A special branch of manufacture consists of the production of puddled steel, which is used chiefly in the works themselves as raw material for the production of crucible cast steel. It is also exported for special purposes, for instance, it is used for making welded spoke wheel and disc wheel centers. It is also sent abroad to transmarine countries as so-called "Milano" and "Bamboo" steel for the manufacture of tools.

The Bessemer steel made at the cast steel factory is used as raw material for the permament way of railroads, such as rails, fish-plates, points and the like, while it is also placed upon the market in the shape of billets for the manufacture of tools, springs, wire and the like.

The crucible steel foundry, called "Schmelzbau," is one of the oldest shops of the Essen Steel Works. It covers a total superficial area of 198,458 square feet. The length of the building is 690 feet and its breadth 287 feet. Crucible steel is the chief product of this shop, which is equipped with 18 furnaces for heating the crucibles, 17 melting furnaces, and 68 gas producers. Ingots can be made up to 85 tons in weight, as we have already said. The casting of an ingot of 80 tons would require the contents of about 1,800 crucibles, each crucible containing 99 pounds of steel, and to manipulate them some 490 men; the time required for the casting would be about 30 minutes. The aforesaid shops are served by four cranes with a total capacity of 173 tons. One of these, which is electrically driven, has a capacity of 80 tons. The crucibles are made in an annex to this building, where they are produced at the rate of 2,700 to 2,800 per day.

Open-Hearth Plant.

The open-hearth steel shop No. 3 located in another annex of the same building has three Martin furnaces which produce basic steel and homogeneous iron for steel castings. The shop is mainly equipped for steel castings; it contains nine core ovens and the necessary mills and mixers for the molding sand. There are 10 cranes with a total lifting capacity of 80 tons. The Essen works contains altogether five open-hearth steel shops. No. 1 is confined to work which is similar to that carried on in

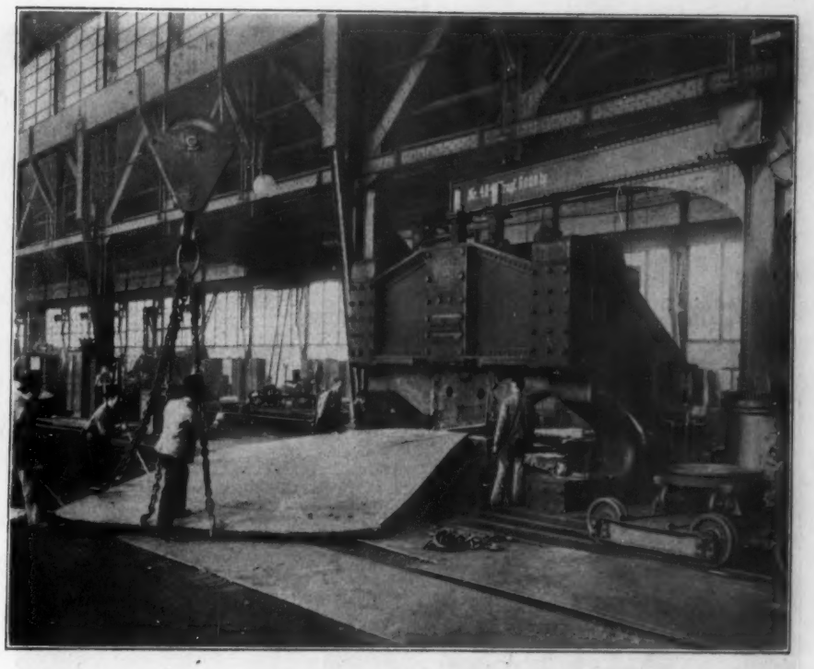


FIG. 5.—HYDRAULIC PLATE SHEAR.

No. 3, No. 2 and No. 4 produce ingots and blooms for plates and forgings. Shop No. 4 is principally used for the manufacture of armor plates. No. 5 is the most recent.

The characteristic feature of this shop is that the level of the furnace beds is above the level of the floor of the shop. The ten furnaces of this shop have capacities of from 25 to 30 tons. The 35 Martin furnaces in the works have a total capacity of 625 tons. Their aggregate actual production daily is over 1,000 tons. The shops together cover a superficial area of more than 354,000 square feet. The cleaning of the castings made in shop No. 3 is carried out in an annex of this shop. The principal castings produced in this shop are the centers of wheels for locomotives and wagons.

FIG. 6.—ROLLING ARMOR PLATE.

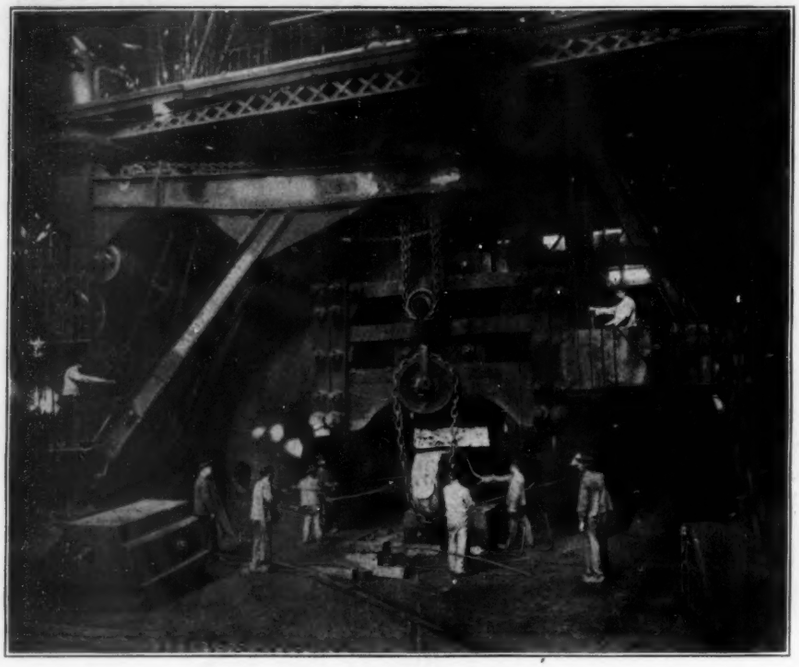


FIG. 7.—50-TON HAMMER "FRITZ."

A shearing machine erected in connection with the armor plate plant can deal with cold plates up to 2¾ inches thick. The water pressure necessary is about 8,800 pounds per square inch. This is obtained by an intensifier which is connected to piping containing water under a pressure of 735 pounds per square inch.

Forging Machinery.

The most powerful steam hammer in the works is one called "Fritz." It was erected in 1860, and has a length of stroke of 126 inches, and a striking mass weighing 50 tons. The second largest is called "Max," and has a striking mass weighing 20 tons and a length of stroke of 118 inches. These two hammers are used for forging medium size guns, crank axles, and so forth.

The heavy blocks for large caliber naval and coast defense guns, for marine shafts, etc., are chiefly forged under a 5,000-ton and a 2,000-ton hydraulic press, erected in a side aisle of the shop in which the entire armor plate manufacture is carried on. This building is a fine glass and steel structure divided into three bays, in which are installed five Martin furnaces of up to 40 tons capacity. The illustration, Fig. 4, shows the casting of a heavy block from two ladles. The cranes on which they swing carry 75 tons each. The rolling mill of the plant has rolls of 13 feet in length. They can take ingots up to 55 inches thick. The mill is driven by a 3,700-horsepower reversible engine. A plate was rolled here from a block weighing 130 tons in the rough, the finished plate was 43 feet 2 inches long, 133 inches wide and 11.8 inches thick, its weight being 106 tons.

The equipment of the shop in bending presses, machine tools, cranes, etc. is in proportion to the pieces to be handled and machined. The crane handling the block under a 5,000-ton press, as shown in Fig. 12, carries weights up to 150 tons. The boring mill shown in another illustration, Fig. 13 turns pieces over 29 feet diameter. The cupola represented is for a coast defense turret and weighs 52 tons.

The Machine Shops.

The above block, by the way, under the 5,000-ton press weighs over 80 tons, and was eventually forged into a shaft which rough forged was 151 feet long and weighed 65 tons. The lathe on which the shaft was turned and trepanned is also a remarkable tool. It stands in machine shop No. 8, Fig. 4, the largest, and most important of its kind in the works. It is of comparatively recent date—work having begun in it in 1901—its equipment is of the most powerful type. Some 80 machine tools are installed, machining the heaviest crank and propeller shafts, fly wheels, steel castings such as stems and stern posts and rudder frames. All machinery is electrically driven, either by individual motors or on the group system. The absence of belting tends to increase the impressioin of spaciousness offered by this magnificent

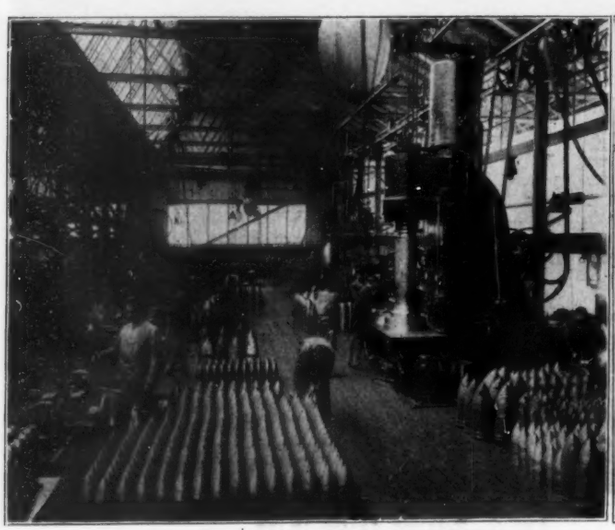


FIG. 8.—PROJECTILE SHOP.

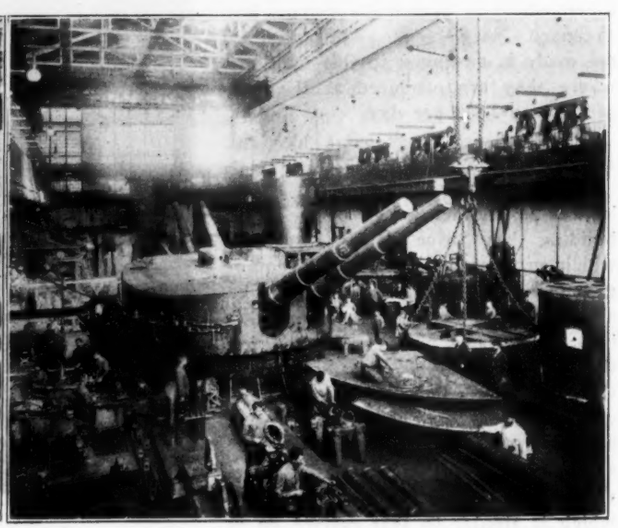


FIG. 9.—CENTRAL BAY OF ORDNANCE SHOP NO. 4.

FIG. 10.—GUN WORKSHOP NO. 7.

FIG. 11.—GUN WORKSHOP NO. 5.

building, which is over 325 feet long and nearly 165 feet wide.

Ordnance Shops.

Although the other mechanical shops are not so vast in size and equipment, some of them are striking enough, for instance, Nos. 4 and 6, which are principally reserved for ordnance work, for the erection and assembling of naval turrets and mounts, the former for medium, the latter for heavy caliber guns. The central bay of shop No. 4 with an 11-inch gun turret in the course of mounting is shown in Fig. 9. The cranes, two of 50, and one of 15 tons, travel at a height of 59 feet above the workshop floor. The turrets are erected here with ammunition shafts and hoists complete, for which purpose the shop is equipped with two pits, one 45 feet, the other 32 feet deep, and of 20 feet 6 inches and 15 feet 5 inches diameter respectively. This building has two lateral annexes, and three floors. An annex at the end contains tools for the manufacture of guns of small caliber, and for the mounting of the hydraulic and electric installations of the turrets.

It would require more space than is here available to enumerate all the workshops engaged in the manufacture of ordnance, the shops where the rough forged A-tubes, jackets, and hoops are turned and bored, the fitting shops for breech mechanisms, the shops in which are built the carriages and mounts, the mechanics' shops where the sights are made, etc. A few of the more important may be picked out.

In the projectile shop there are 634 machines with approximately 6¼ miles of belting. In the annexes of this building are the rooms which are set apart for the inspection and painting of the projectiles.

It may be mentioned here that the Essen works is being considerably enlarged at present. Whoever comes to Essen now will see a number of old

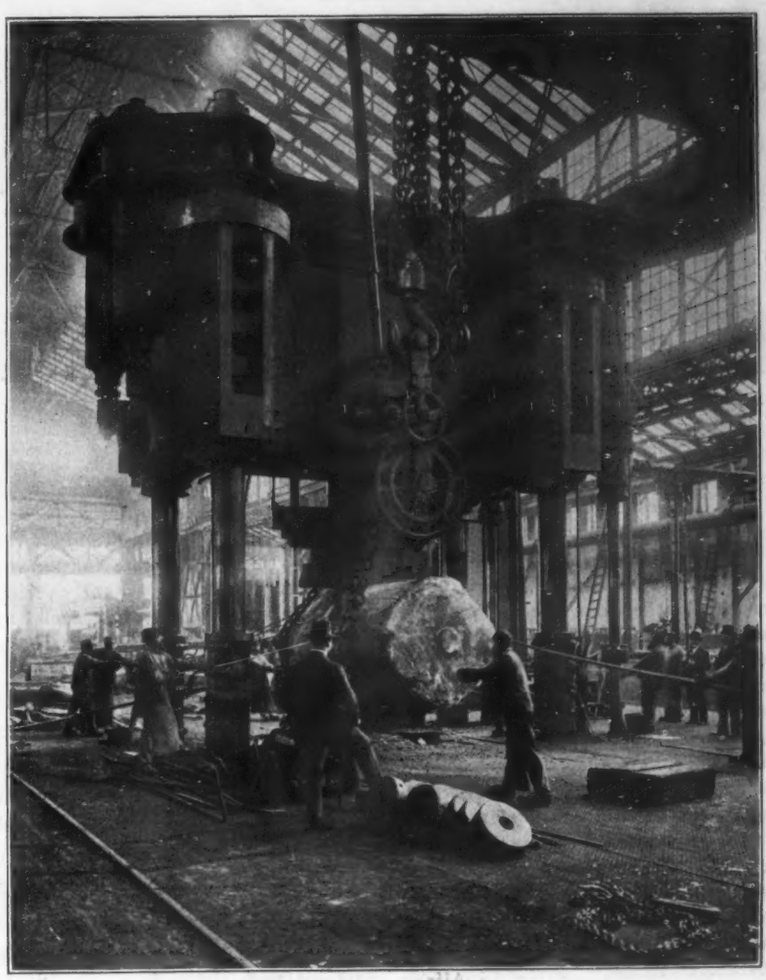


FIG. 12.—5,000-TON HYDRAULIC FORGING PRESS.

shops being razed to give way to new buildings, and will notice large imposing structures in the course of erection. These extensions seem only natural if we remember that the recent development of the Essen Krupp works shows an increase of over 10,000 workmen within the last four years, there being 25,000 in 1902 as compared to nearly 36,000 in 1906.

The Blast Furnaces at Duisburg.

The fact has been referred to above that the Krupp works exploits its own coal and iron ore mines. It also produces in its own blast furnace plants all the pig iron required by the different steel works and has done so ever since the middle of the last century. It still possesses two plants in the middle of the Rhine iron ore district. When the works rapidly grew in the nineties, the erection of a new blast furnace plant became necessary. This was begun in 1896 on the banks of the Rhine opposite the town of Duisburg. Three furnaces of 14,125 cubic feet capacity were first built. Four more of 21,188 cubic feet have been added since. As they are constructed on entirely modern principles, they provide for the utilization of the blast furnace gases, and the energy thus recovered was more than was used to work the plant. To utilize the excess, steel works and rolling mills were added. The entire establishment which in 1904 was named "Friedrich-Alfred-Hutte" in memory of the late Friedrich Alfred Krupp, now forms one of the finest and most important establisments of its kind.

The blast furnace plant is equipped with eight electrically driven ore handling cranes, with a capacity of about 50 tons per hour. These are used for unloading and discharging into the store-rooms or elsewhere upon their own quay 1,640 feet long. The raw material arrives on Rhine steamers and is drawn off below from the store-rooms through trap doors and conveyed in trolleys suspended on cableways to electrically operated furnace hoists, and from these to the furnaces by means of the electrically operated charging devices. There are also 14 combustion engines working on blast furnace gas, with a total output of 494,000 cubic feet per minute for blowing the blast furnaces. Four vertical compound blowing engines, each supplying 31,780 cubic feet of air per minute, are kept in reserve.

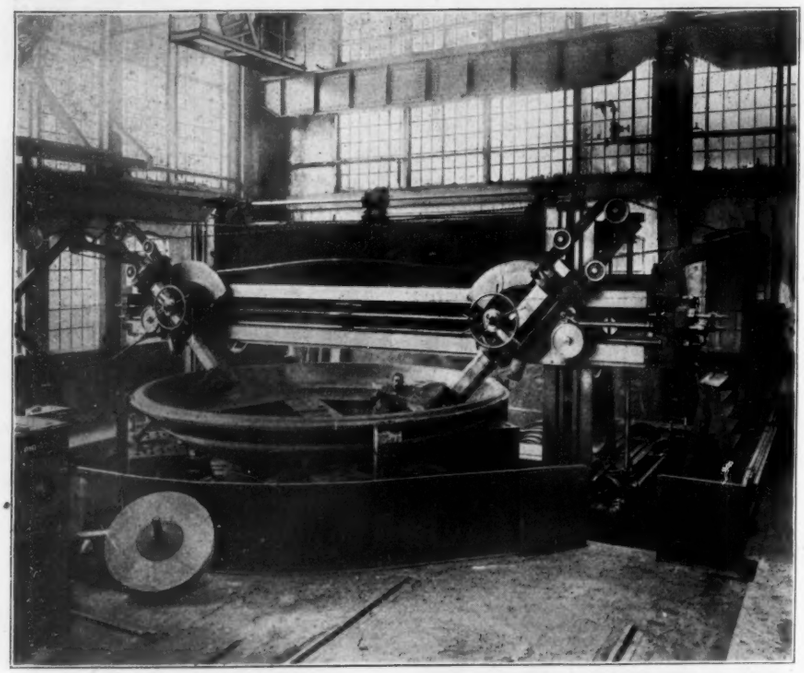


FIG. 13.—BORING MILL WORKING ON 52-TON CUPOLA FOR COAST DEFENSE GUN.

In connection with each furnace there are five Cowper stoves 101 and 114 feet high, respectively. The blast furnace plant also comprises one coking plant of two sets of 60 ovens each, with a daily output of 550 tons of blast furnace coke, besides by-products.

The Martin and Thomas Works.

The Martin works, erected in 1900, contains two 35-ton furnaces with an electrically driven overhead casting crane. This establishment is intended to work up the waste obtained from the rolling mills with a suitable addition of pig iron.

The Thomas works comprises: The mixing plant with two 550-ton mixers and two cupola furnaces for remelting the Thomas pig tapped on Sundays and holidays, and cast on a bed equipped with traveling cranes; the converter plant, with four 25-ton converters, two spiegel melting furnaces and one preheating furnace for ferro-manganese, etc.; the foundry with several cranes for transporting the ingots and ingot molds, the engine house with the steam blowing engines, and the pumping plant. As supplementary industries, there are the following works: One lime kiln with two cupola furnaces; one dolomite and brick factory with two cupola furnaces, the necessary dressing machines, a stone press, one machine to stamp converter bottoms, and also the requisite other furnaces; one slag mill to grind down the Thomas slag into phosphate meal.

The Rolling Mills.

The rolling mills comprise: Two reversing two-high mills with rolls of 45 inches diameter, with two steam engines and four block shears; one reversing two-high mill with rolls of 33½ inches diameter, steam engine driven. This engine on the other side, drives a 33½-inch three-high train; one 23-inch three-high mill with gas motor; one 20-inch three-high mill with gas motor, one 16½-inch three-high mill and 20½-inch intermediate frame with gas motor; one double 13-inch two-high mill, and 20½-inch intermediate gear with gas motor.

The Steel Works at Annen.

The steel works at Annen, in Wesphalia, were purchased by Krupp in 1886. Their specialty is open hearth steel and crucible steel castings for ships, locomotives, dynamos, steam engines and small arms. The works includes three open hearth furnaces of a total capacity of 40 tons, two furnaces for crucible steel, capable of holding 100 crucibles each, with the requisite four heating furnaces, besides mechanical workshops, machine shops, a new rolling mill, etc. Finished steel castings up to 55,000 pounds can be turned out in the shops.

The Gruson Works.

The Gruson works at Magdeburg-Buckau passed into Krupp possession in 1893. This vast establishment, divided into fifty different shops, covering an area of 75 acres, keep at work

75 furnaces, 66 steam engines of an aggregate power of 2,015 horsepower, 163 electric motors of 2,400 horsepower, together with 1,650 machine tools, 405 traveling and turning cranes and lifts of a capacity up to 150 tons.

A standard gage railway, with about five miles of track, equipped with 40 turntables, runs through the workshops and loading stations, and is in direct connection with the Buckau railway station. The access to the workshops and communication between the several shops are secured by a narrow gage railway 3½ miles long, with 77 turntables. For the conveyance of armor plates, the factory possesses a steam traction engine and 10 special trucks, of which the largest is 25 yards long and carries 95 tons.

Communication Systems.

All the shops and offices can communicate with one another through a private telephone system. The factory possesses also connections with the public telephone system. A telegraph station allows the factory to communicate directly with the imperial telegraph office.

Raw Material Tests.

The mechanical properties of the materials which are used are continually subjected to tests with regard to durability, to bending and to resistance to shocks, with the aid of special apparatus. Moreover, several chemical laboratories are adjunct to the works.

For the development of the Gruson works, the iron foundry, especially the production of chilled iron castings, has been of fundamental importance. The latter still continues to form one of the leading specialties. By means of peculiarly suitable kinds of iron and by using cast iron molds instead of molds of sand, a material is obtained which is refined by the Styrian process, i. e., by gradual transition from the hard white into the soft gray layer.

These chilled castings are especially suitable for the manufacture of articles which require a hard upper surface combined with tenacity and strength of material. One of the chief uses is for military purposes, in connection with the production of armored conning towers, batteries and the like intended for coast defense purposes, while in industrial circles chilled castings are also largely used for the manufacture of wheels, switches and points for mine railways, tramways and railway companies.

In 1900, a special foundry was erected for chilled cast iron wheels, in which chilled cast iron driving wheels are also made on the Griffin process. These castings further are also used in machines for dealing with raw materials, e. g., in rolling mills for making metal, paper, rubber, linoleum, etc., and in machines for crushing raw stuffs, and especially in devils for the disintegration of ores, coal, coke and also in ball mills, stone breakers, edge runner mills, etc.

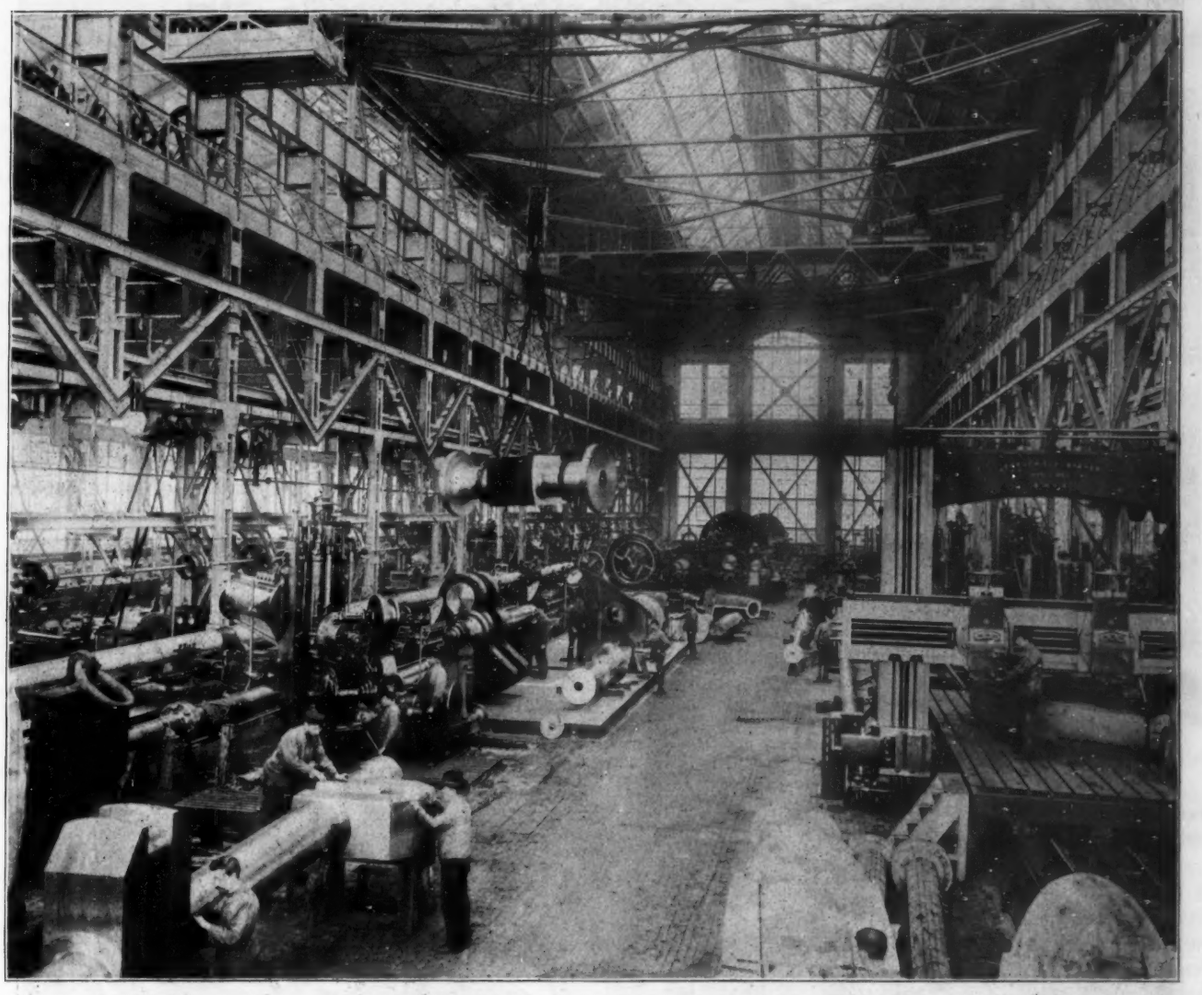


FIG. 14.—MECHANICAL WORKSHOP NO. 8.

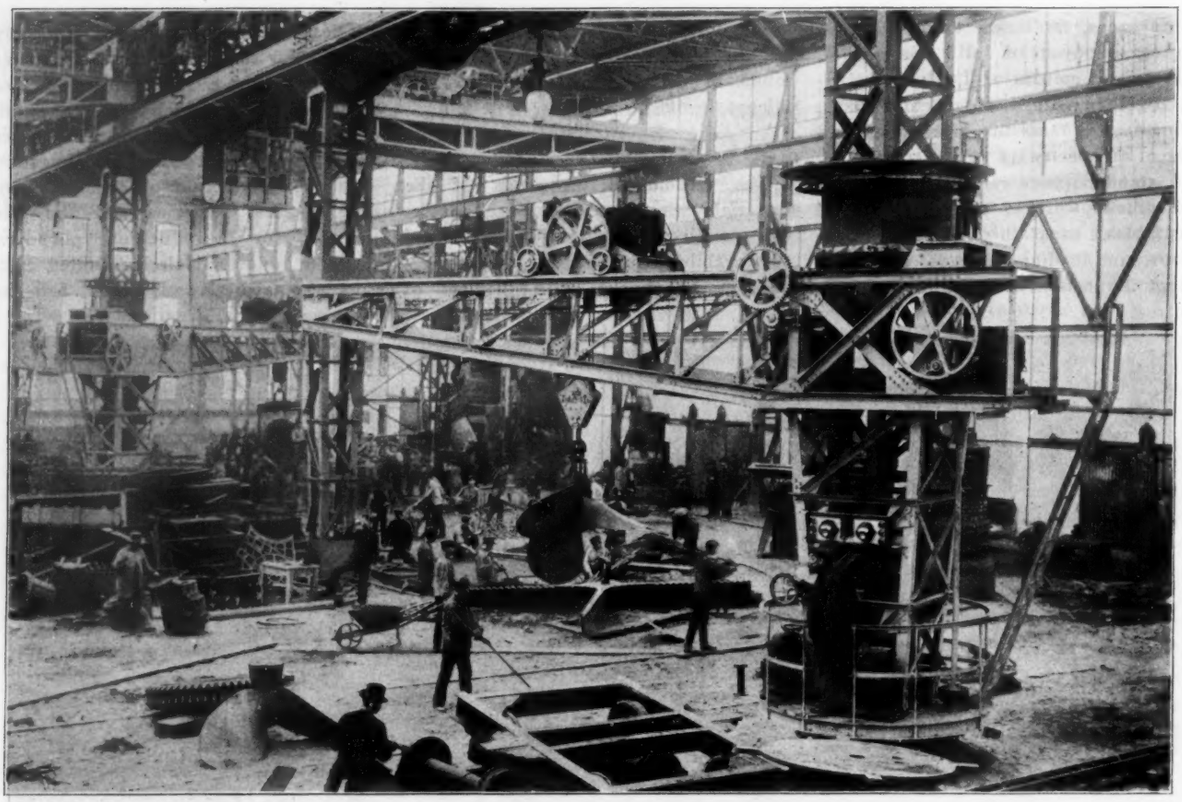


FIG. 15.—IRON FOUNDRY AT GERMANIA SHIP YARD, KIEL.

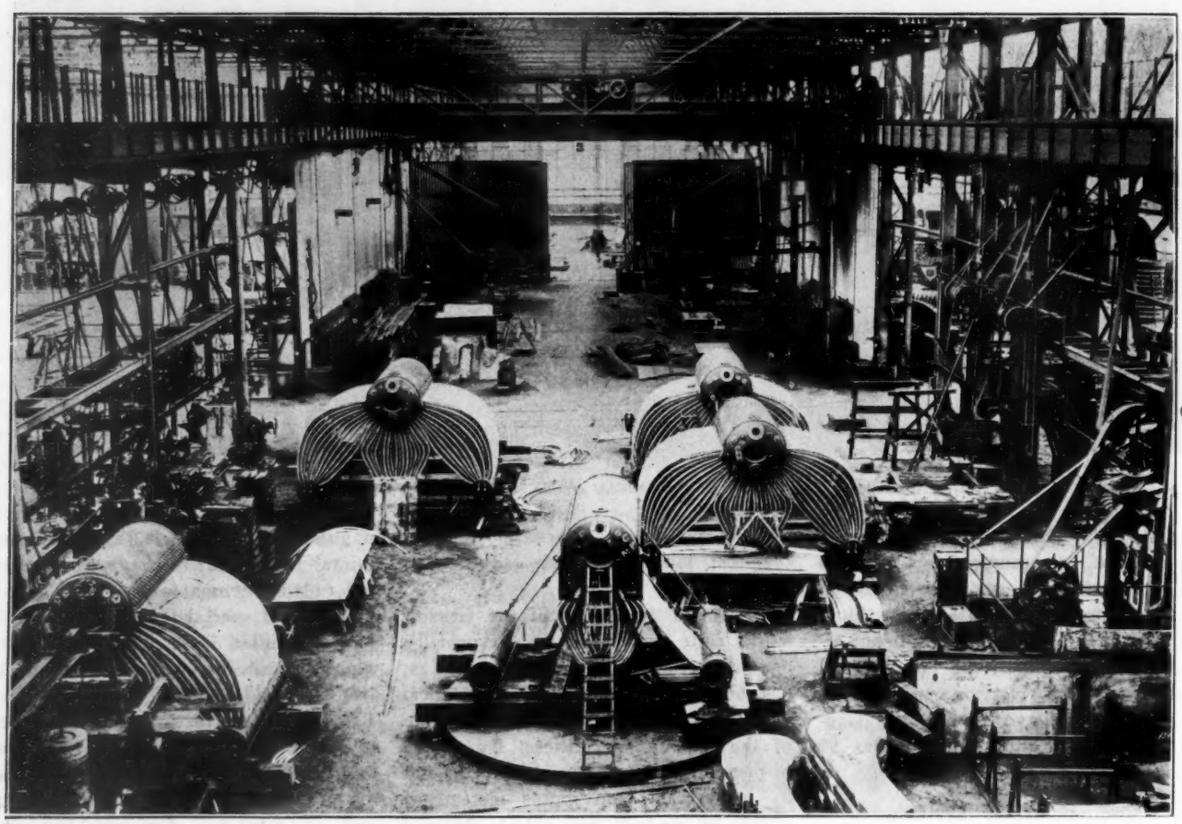


FIG. 16.—BOILER WORKS AT GERMANIA SHIP YARD, KIEL.

Most of the firm's specialties have been derived from the manufacture of individual parts of machinery from chilled cast iron made in plaster or sand molds.

Besides chilled cast iron, the firm has since the end of the eighties, also made steel castings for various uses, such as the manufacture of wheels, parts of stamp batteries, ball mills, parts of all kinds of machinery, parts for ship building, electrical plants, etc., this steel being produced in an establishment modeled upon the lines of the works at Essen.

For all articles which are subjected to a high degree of wear and tear, a material is used which has already become favorably known under the name of "hard steel," especially in connection with the manufacture of breaken jaws, breaker mills, roller rings, etc. The works also make tempered castings of great tenacity and toughness for the most various uses.

The Germania Shipyard.

In 1896 Krupp added to the various industries embraced by the works that of ship building by taking over the shipyard Germania, at Kiel, which was entirely remodeled and extended so as to become one of the finest shipyards in Germany.

Special attention has been bestowed upon the construction of the shipbuilding slips, of which there are to be eight, and of which seven are finished at present. Their lengths vary from 400 to 640 feet and their widths from 70 to 120 feet. The eighth slip will be 340 feet long. As slip No. 7 also permits the building of ships of over 800 feet long, the Germaniawerft will be able to build simultaneously two vessels of the largest dimensions.

Of the seven slips which are finished four are entirely roofed in with iron and glass. The largest one is 102 feet high on the wharf side and 120 feet on the water side. Both sides lengthwise have been left open to a certain height. The facade toward the harbor is also glazed in the higher part.

Each shed is equipped with two electric traveling cranes moving side by side and capable of lifting six tons each. It is expected that the use of roofed docks will considerably shorten the time required for the construction of ships, as there will be no need to stop work on account of bad weather. Besides the roofing will protect the slips and the machinery employed in construction. In addition to the eight slips mentioned, there is another one, where five or six torpedo-boats can be built simultaneously.

The various workshops, forges and storehouses are grouped round the docks. Nearest the wharf a workshop extends for a length of 450 feet. This workshop is equipped with all the necessary machinery for working metals. Each bay is fitted with a traveling crane of three tons and is crossed by four railway lines connected with lines of rails alongside the docks.

Southward of this shop are the buildings for the forges. These cover a total area of nearly two acres. Alongside the forge is a one-legged gantry crane of 40 tons capacity for handling plate. To the west is the smith's shop, which includes about 100 machine tools of every description and size.

To the smith shop is annexed a workshop for galvanizing torpedo-boats. Opposite the smith's shop, on the quay, is a large three-story building containing the carpenter and joiner shop, the paint shop, stores, etc. From the first floor a hanging bridge 4½ yards wide leads to the ships alongside the quay, ready for rigging, which allows the different rigging gears to be delivered directly from the store to the ship.

The greatest plant of the whole shipyard is the building comprising the fitting and finishing shops, with the copper forge and the plate shops, forming altogether a shop with seven bays and covering an area of 4½ acres. The principal bay constitutes the fitters' shop, with a floor space 165 feet long and about 36 feet wide. The steam engine shops are remarkable on account of the wealth of their equipment, comprising about 400 machine tools of the latest patterns. Also worth mentioning in the neighborhood of these shops, are the testing departments for steam engines and boilers and the two-story warehouse.

The most remarkable of buildings of the lower part of the yard is the one containing the principal offices. The length of its facade is 262 feet and it covers an area of one-half acre.

The foundry occupies a seven-bay building, covering an area of about 2½ acres. It includes a small smith shop and a joiner's shop as well.

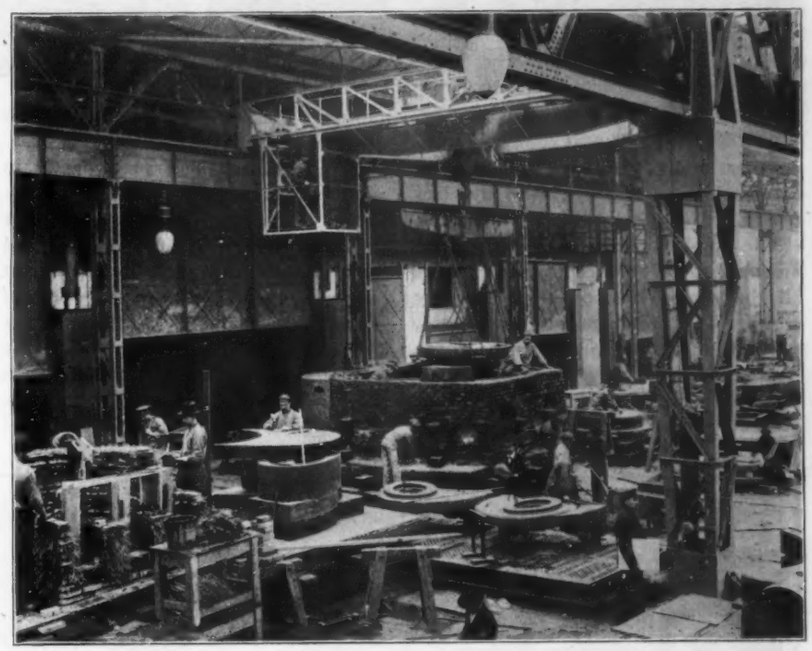


FIG. 17.—IRON FOUNDRY AT GERMANIA SHIP YARD, KIEL.

The neighboring boiler shop is a little over 400 feet long and 212 feet wide. The shop contains numerous machine tools driven by compressed air, hydraulic riveting machines and an outfit for galvanizing. Close by the boiler shop extends the central electric power station provided with five triple-expansion engines, two of 375 horsepower and three of 750 horsepower. They are connected with a central condenser and directly connected to seven direct-current dynamos.

The equipment with regard to machine tools and motive power of these new factories is indeed the most complete that can be imagined; the number of machine tools is about 1,000 and electric power is almost exclusively in use. Excepting a few installations, where for special reasons

FIG. 18.—A ONE FAMILY HOUSE IN WORKINGMEN'S COLONY.

FIG. 19.—A STREET IN THE WORKINGMEN'S COLONY.

another kind of power is required, all the machine tools are worked by electricity, either individually or in groups.

The number of dynamos and motors amounts to 207. Excepting the forges all the enclosed shops are heated by steam. The buildings and workshops, the drydocks and open dockyards are lighted by electricity, being equipped with 535 arc lamps and 5,100 incandescent lamps. The workingmen's welfare has been kept prominently in mind in the various Krupp establishments. A hundred shops and factories supply to the working staff its food products and domestic requisites at reduced rates. A large number of settlements supply lodgings. There are, besides, a hospital, an aid society for the sick, two institutions for workmen retired on pensions, dispensaries, homes for the aged, and others of similar import. At Essen, for instance, there are among others an employes' club, a foreman's club, a domestic training school, and industrial school for adults, three industrial schools for girls, a circulating library, a savings bank, and a life insurance society. Nothing seems to have been forgotten in these great works, which are models of their kind from nearly all points of view.

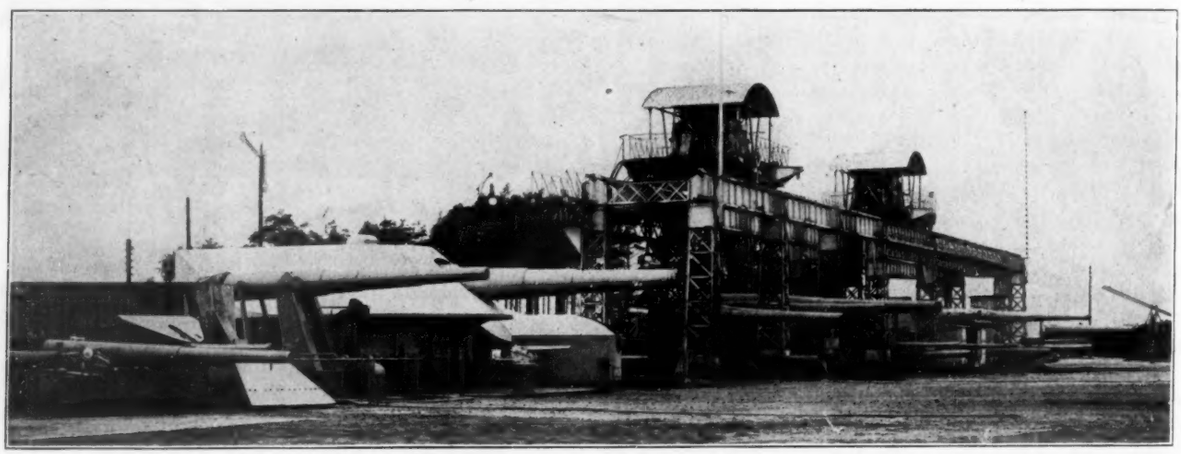


FIG. 20.—THE PROVING GROUND AT HEPPEN.

WILL DISCUSS INDUSTRIAL EDUCATION.

The American Society of Mechanical Engineers will hold the first monthly meeting this fall on Tuesday evening, Oct. 8, at 7.45, in the main auditorium of the Engineering Societies building at 29 West 39th street, New York.

The subject of this meeting, "Industrial Education," is one in which manufacturers are very much interested. College technical courses and the student apprenticeship courses will be discussed at length by men who have been in charge of theoretical and practical institutions. Prof. John Price Jackson has written a paper on "College Technical Courses and Apprenticeship Courses Offered by Manufacturing Establishments." He gives data in the form of letters from several of the largest manufacturing establishments in America in which they outline the courses offered by the factories, and explains the manner of conducting the same.

Dr. Henry S. Pritchett, president of the Carnegie Foundation and president of the Society for the Promotion of Industrial Education, and Prof. Dugald C. Jackson, of Massachusetts Institute of Technology, and president of the Society for Promotion of Engineering Education, will deliver short addresses on the subjects allied to their societies. Other manufacturers have been invited to speak informally at the meeting of their experiences and altogether it is expected that the meeting will prove interesting and instructive.

THE DRAFTING ROOM, ITS LOCATION AND WORK[1]

BY OSCAR E. PERRIGO

If we are called upon to formulate plans for the building of a large manufacturing establishment, the first consideration is probably the character and quantity of the output to be provided for; the next is what manufacturing departments will be necessary to economically and expeditiously turn out the work. Next, we shall consider from the nature and purpose of these different departments how they should be located, with reference to the plant in general and with those with which, by the nature of their particular part in the work, they are to be most intimately connected. Proceeding in this manner, we shall doubtless find that the location of the drafting room will be a question very near the head of the list, for the reason that under the usual circumstances and conditions attending the production of new mechanical work, the drafting room is where the first work is to be performed.

And just here it may not be out of place to refer to the usual title of drafting room or drawing room. The first designation seems the more preferable of the two, and is a term not to be confused with one of quite a different meaning. Again, until a comparatively recent date, either of these titles was comprehensive enough, as it covered fairly well the usual work of designing and drawing. This work consisted almost entirely of designing machinery and making the working drawings for the use of the pattern makers and machinists who built it. The draftsman usually had very little latitude in what he should design, his work frequently coming to him from some official of the company who was neither a draftsman or a mechanic, with quite definite orders as to what he should produce, how he should produce it, and what he should not do. Often the materials to be used were specified, and he was hedged about with many like restrictions which prevented to a great extent, his development along engineering lines.

In the drafting room of a company that had been long in the business, the writer saw a drawing of a certain device, having this note written on it, "advocated for seven years by (giving his name) and adopted, (giving date)". His honest protest lived after him and it is but fair to say that the device had proven a very desirable and successful one.

Complaints are frequently heard of the lack of proper accommodations and facilities for draftsmen, and in many cases they may be very proper and reasonable; yet the surroundings and the conditions as well as the privilege of the draftsmen at the present time are vastly superior to anything enjoyed by the older draftsmen in their time, and have at least kept pace with the advancement of the mechanical arts in other directions.

To illustrate this the plan in Fig. 1 is given of a plant in which the writer was once employed as a draftsman. With the exception of the boiler house, the buildings were of wood, the machine shop consisting of a ground floor and a narrow gallery on each side. The portion containing the engine room, drafting room, office, etc., was a shed-like addition to the main building. The engine room and drafting room were separated by a thin board partition through windows in which an excellent view of the 20-foot balance wheel of the engine could be had, as it was only about two feet distant. Through two windows facing the yard was an equally good view of a brick chimney only about 10 feet away. At these windows two draftsmen were supposed to work, using the table next to the engine room for reference drawings. In the corner was a desk for the shipper, and as the office did not communicate directly with the shop, everybody going to and from it passed through the drafting room. The delicate aroma of wet paint and the buzz of the emery wheels blended with the smoke from the chimney and were gently wafted into the open windows in warm weather, while the roar and jar of the engine and the rattle of castings, frequently dumped from a cart at the front door only a few feet away, combined to make the lot of the draftsman anything but a happy one. Manilla paper was used for all the drawings. White paper would have been the same color in a few hours, yet in that dingy room were designed some of the valuable improvements in the machines built that are in use on prominent machine tools today.

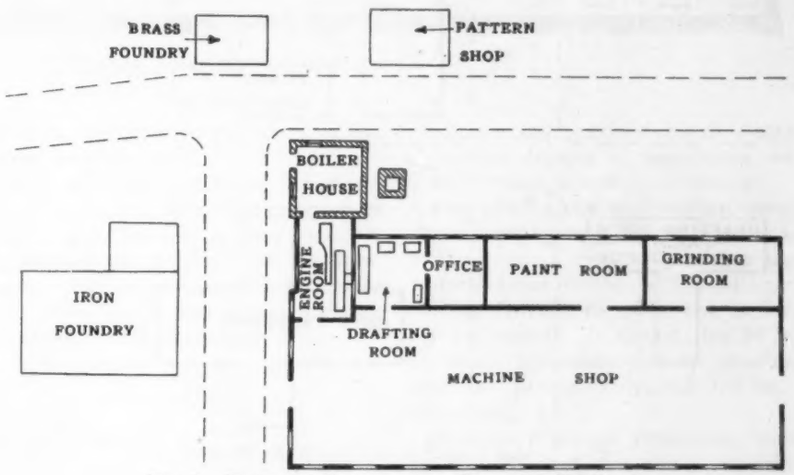


FIG. 1.—DRAFTING ROOM IN THE GOOD OLD TIMES.

Such was the drafting room of former years. But the department has of late years been brought up to a much higher plane and in a larger and a broader sense extended technically, mechanically and commercially; and in many establishments of even moderate pretentions it may properly be designated as the engineering department.

In this capacity, the business in prospect, or in the form of orders, must come to it almost as soon as it reaches the desk of the general manager, since estimates on such new business as requires them must be here made before work can proceed, or before prices can be given for the work to be performed. In many cases the customer furnishes drawings which are available for this work, while in others considerable engineering work of this character must be done before really

[1]The first of a series of articles on Shop Management and Cost Keeping.

accurate and useful estimates can be made.

In some establishments, this work is given to a special estimating department under charge of the sales manager. For some classes of estimating such a course may be advisable and proper, but when the estimate is later on to involve the building and sometimes even the designing of new machinery, it is at once apparent that the engineering department, (including, of course, the draftsmen's division), is the proper force to take it up. In consequence of these conditions and requirements, while it is proper and frequently convenient for the sales manager to have on his staff a mechanical engineer to whom he can readily refer for much of the information he may require, he should not be burdened with the consideration of questions which are strictly engineering in character.

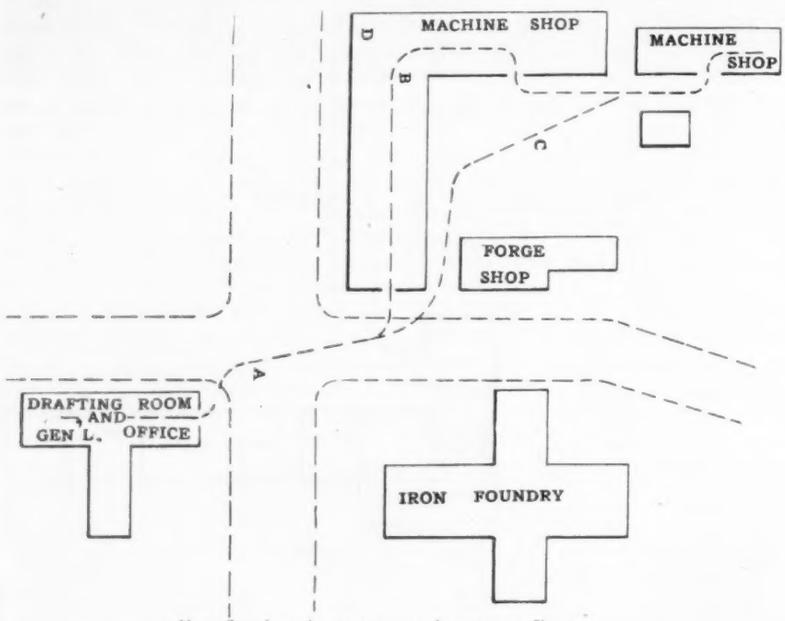


FIG. 2.—AN AWKWARDLY ARRANGED PLANT.

These conditions would point to the convenience of having the engineering department located near the office of the general manager. At the same time, there will be many conferences necessary with the general superintendent, which also will make it desirable that it be located in the vicinity of his office. Still, these conferences with the general manager will be infrequent as compared to those daily necessary between the draftsmen and the shop superintendent on new machines, tools and fixtures that are constantly being designed, and which would render the call of this official for the location of the draftsmen in the vicinity of his office the more important. Or, to adopt the other alternative, he is given one or more draftsmen to work in or near his office, on such designs for tools, jigs and fixtures as he may wish to have made under his personal supervision. This expedient as well as any other tending to divide the force of draftsmen, or to take them from the control of the chief of the department should be discountenanced, on account of its tendency to disorganize the department.

Again, in the regular routine of work, the draftsmen are frequently required to visit various parts of the machine shop and the shorter the distances they must go to reach the desired points the less time will be spent away from their drawing boards. The same argument holds good in relation to the pattern shop, which the draftsmen must also visit frequently for consultation with the foreman pattern maker as to the best forms for castings and the best methods of designing patterns. To these conferences it is frequently desirable to call the foundry foreman; consequently, it is desirable that his department should be located within at least easy reach.

An example of very awkward arrangement of buildings and departments is given in Fig. 2. In this case the route of the draftsmen by the dotted line, A, to the front door of the machine shop is 450 feet. To the farther end of the machine shop by route B, passing through doors as they actually exist, is 1,100 feet. During fair weather the draftsman may make a short cut by taking route C, and have to walk about 900 feet. By locating the drafting room on one of the upper of the three floors in this building, a great deal of the time wasted by these long walks might be saved. Obviously, the point D would be the most convenient from which to administer the affairs of the machine shop, were it not for the distant location of the general office. The superintendent's office being already in the front end of the machine shop building, the drafting room and pattern shop were both moved there.

The lack of proper engineers' plans in the laying out of this plant is painfully apparent, particularly when it is considered that this plant is not extensive enough to require the services of over six or eight men in an engineering department, and, therefore, their duties are comparatively more varied than would be the case if the force were large enough to be divided into several classes, according to the nature of the work, which includes estimating, experimental work, tools, jigs, fixtures, and the regular work of designing, detailing and tracing new work.

An engineering department designed to meet the general requirements, and erected as a part of a large plant is shown in Fig. 3. It occupies one floor of an office building and exhibits the modern practice of arranging the details of the floor space for such uses. A large vault is provided for storing drawings and records. This is built out into the main room somewhat so as to afford space beyond it for the water closets and still not extend this addition further than necessary to the rear. This extension is made of sufficient width to contain the lavatory and stair hall. Should the building be of three or more floors, an elevator should be provided, and may be located at the left of the vault without disturbing the plan.

The spaces between the central columns, usually the least valuable, are occupied by lockers. By this arrangement, two useful results are obtained; the lockers are located conveniently for the men, and from their height serve as a dividing screen between the two sides of the room without in any way affecting the light.

At the left end of the room, are two offices for the mechanical engineer and chief draftsman, enclosed by wire screens, so as to offer the least obstruction to the light. Within these enclosures are shown four drawing

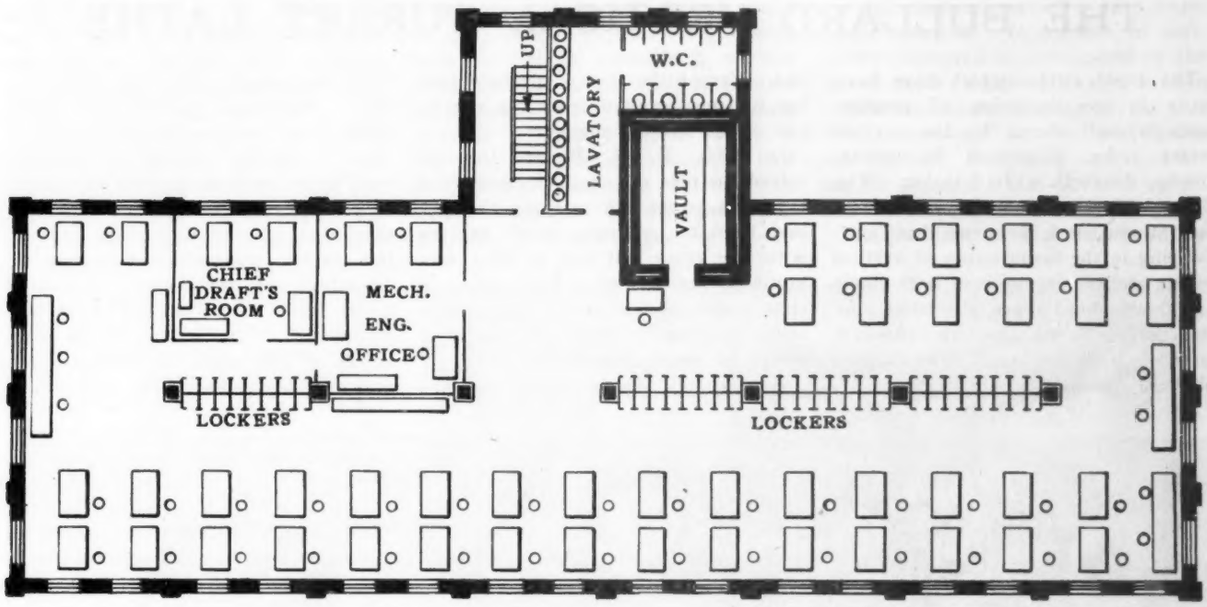


FIG. 3.—A MODERN ENGINEERING DEPARTMENT.

tables and several other spaces indicated for desks, tables, filing cases, etc. These, of course, are to be so arranged as to suit the particular wants of the officials. Another enclosure for a similar purpose may be conveniently arranged by continuing the wire screen to the end of the building, and so placing the drawing tables as to conform to this plan.

The regular drawing tables shown are about three by five feet. Those of larger dimensions at the ends of the room may be used by the tracers or for very large drawings.

The blue printing room, dark room, etc., are located on the floor above (if the building is of more than three floors) or in a suitable structure built in with the roof construction. A convenient hand elevator may be placed at the right of the vault door for sending tracings, blue prints, etc., up and down.

A convenient arrangement of the buildings of a manufacturing plant is shown in Fig. 4, in which the above described plan is incorporated as a part of the office building at the center of the front line and having the machine shop and the iron foundry located on the right and left, respectively, and the pattern building in the rear. In this plan a space of about 20 feet separates the buildings whose second floors are connected by foot bridges. This device may be somewhat objectionable from an architectural point of view, but is very convenient in practice and considerably safer when fire risk is considered than it is to join all these buildings in one large structure.

The office building should be of two or more floors. If of three floors, the first may be used as a show room for exhibiting the products of the company. The general offices will occupy the second floor and the engineering department the third floor.

Similarly, the first floor of the pat-

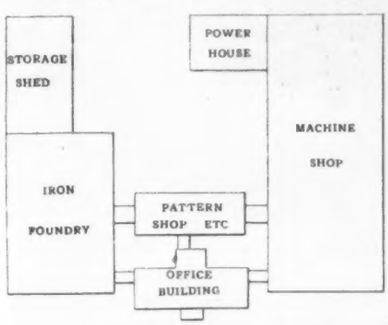


FIG. 4.—COMPACT ARRANGEMENT OF BUILDINGS.

tern building may be used as a store and shipping room, the second floor for the pattern shop and the third for pattern storage. Should these buildings be of but two floors each the pattern shop and engineering department will be on the same level and communication between them very convenient. With the pattern storage on the third floor, there should be an elevator for carrying patterns to the ground floor and back to storage, and to transport lumber to the pattern shop.

From the foregoing review of the conditions and requirements of plants of various degrees of importance, we come to these conclusions, namely:

First—For small and medium sized plants, employing up to 500 men, working on a regular product, the drafting room should be located near the superintendent's office, and be under his control. It should also be in as direct communication as possible with the pattern shop and the machine shop.

Second—In plants employing from 500 to 1,000 men, and doing not only a regular line of work, but some miscellaneous work for various customers, the drafting room should also be in convenient communication with the general office when drawings and estimates are wanted for prospective customers, and should have one and preferably two men, well trained in making these preliminary drawings, estimates, etc. The department should also be within easy reach of the pattern shop and machine shop.

Third—In large plants, doing a general engineering business, taking contracts for a variety of machinery, or requiring a large number of engineering drawings for installing its product in various places, the drafting room becomes an engineering department, and should be located in direct communication with the general office and the sales office, and be organized with a special division for making preliminary plans and estimates. If possible, it should also be within easy reach of the pattern shop and machine shop.

THE BULLARD VERTICAL TURRET LATHE

The rapid strides which have been made in the designing of machine tools is well shown by the vertical turret lathe, illustrated by photographs herewith. Its maker, The Bullard Machine Tool Co., of Bridgeport, Conn., had for years been specializing in the manufacture of vertical boring and turning mills of both single and double head types, the latter construction, with its absolute independence of feeds for each head, having obviously greater productive capacity than the single head machines of equal size.

The proposition of equipping the smaller size machines with two heads similar in design and construction to those in use on the larger tools meet with success only in a measurable degree for there were many operations where only one head—if two were mounted in the conventional manner—could be brought into play unless the second head was swiveled to an excessive angle on the rail and extended from its supporting saddle to a point where the two tools could be used in close proximity. The efficiency of the head thus used was materially reduced and as a consequence feeds and speeds were of necessity reduced to a point below the danger line. Very little, if any, ultimate saving in time resulted from the use of two heads in this manner.

In 1900, E. P. Bullard Jr. conceived the idea of practically swiveling that part of the rail carrying the second head to an angle of 90 degrees with the cross rail and in that way attaining the desired end—a saving in time made possible by the use of two tools working in close proximity on pieces of small diameter.

A relatively simple machine having but two mechanical speed changes, carrying a turret head on a stationary cross rail in conjunction with a vertically movable saddle, carrying a cross slide, mounted on a vertical ways incorporated in the bed of the machine was the result of these first efforts, Six of these tools were built and placed in operation in various plants, but is was considered best to try the idea out in a thorough manner before attempting to place it upon the market.

For a period of four years these machines were under close observation and their operation carefully noted with a view to possible improvement. The result was that an entirely new machine embodying the side head feature in a much improved form was placed upon the market in 1904. Additional features have been added from time to time, each with a view to greater productive capacity, until in the present machine the maker believes that it has the most highly developed machine tool of its class on the market, and which possesses an advantage over the ordinary horizontal turret lathe in the simplicity of tool equipment. This is due to the main turret on the cross rail having a full universal movement, both vertical and horizontal, throughout the entire range of the machine. This renders expensive overhanging cathead cutters unnecessary, as is shown in Fig. 3.

As now constructed the machine consists of an exceptionally rigid bed of vertical box construction, internally braced against all strains incident to its duty, on which are mounted a cross and vertical rail. The extension of the bed base serves to support a table spindle of large proportions and permits an exceptionally efficient system of lubrication to be used, whereby the spindle is at all times immersed in a bath of oil.

The machine is of the single belt speed and gear box construction, 15 speeds being obtained by a set of gears and friction clutches encased in the

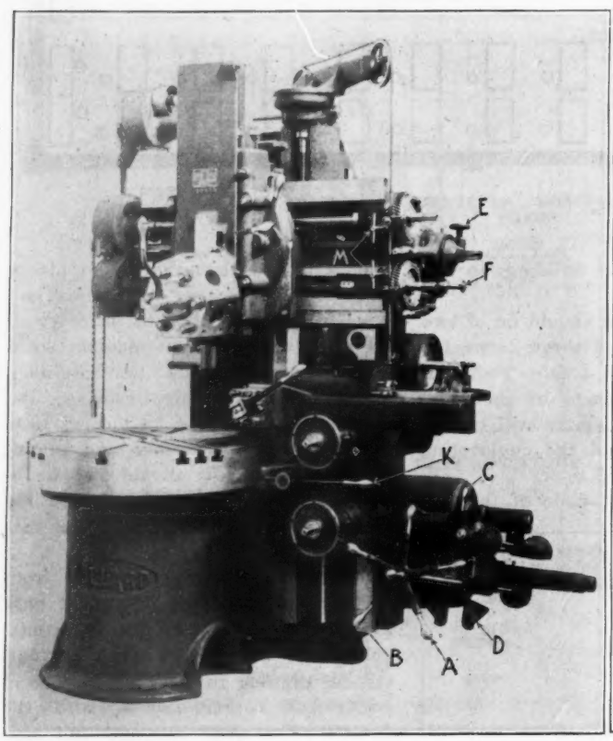


FIG. 1.—FRONT OF BULLARD VERTICAL TURRET LATHE.

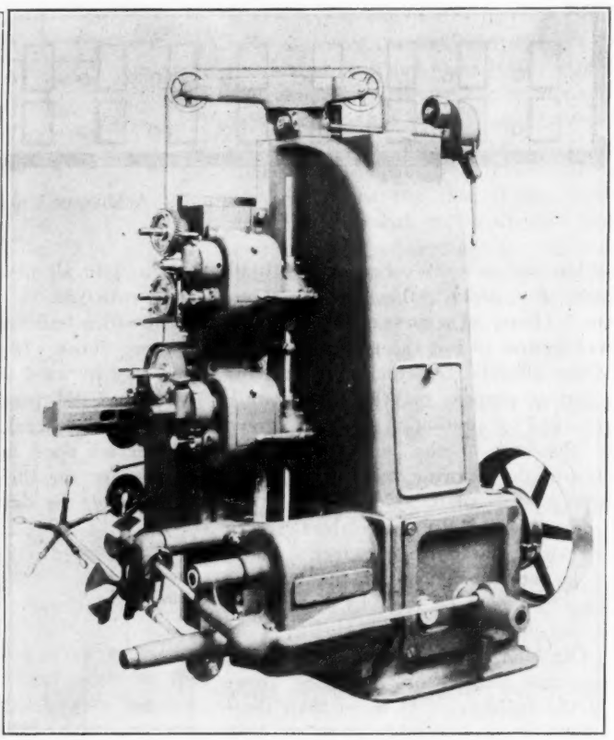


FIG. 2.—BACK OF BULLARD VERTICAL TURRET LATHE.

speed box shown at the side of the tool in Fig. 1 in combination with three sets of reduction gears mounted as a unit inside of the bed and transmitting power to the table by a spur pinion and internal gear. A notable feature of the drive is that there is no step up in the gear train, the first motion shaft running the fastest of all, with a continuous drop between it and the table.

The mechanism for changing table speeds is of unique design, bearing a close resemblance in appearance to the steering column of an automobile. Speed box changes, of which there are five, are obtained by revolving the pilot wheel A mounted on shaft B each spoke indicating a speed which is engaged only when that spoke is in a vertical position. Three speed changes are available in the headstock, giving the total range of 15 for the machine. The quick acting brake is also actuated by this lever B when lifted. Headstock changes are controlled by the lever C which has three positions giving various series of table speeds.

The movements of these levers are all interlocking, through the yoke and disc D, to make conflict between them impossible. The engagement of the positive clutches in the headstock reduction gearing can only be changed when the brake is set, and the brake cannot be released until the desired change has been fully accomplished; the speed box changes cannot be made unless the brake is disengaged, and the clutches therein are protected from harm by a provision which renders it impossible to apply the brake so long as a friction is in engagement. While absolutely protecting the driving mechanism from breakage due to careless handling this interlocking system in no way interferes with the rapid manipulation of the machine—any speed being obtainable without the operator stepping from the working position. Figures on the disc D indicate the number of revolutions per minute of the table given by the particular combination engaged.

The feed works for each head, while identical in design, are absolutely independent of each other. The eight changes are obtained in two series of four by opposed cones of gears constantly in mesh, "diving" keys being selectively set by two handles E and F on each feed box. Graduations showing the feed in engagement are conveniently located.

It will be noted from the photographs that there are no pull gears on the various feed rods. The change from vertical to cross feed, or vice versa, on the vertical head is effected by the engagement of the drop worm centrally located between the rods The same changes in direction of feed in the side head are obtained by clutches actuated by the horizontal lever K. Breakage of gearing by collision of the two heads is obviated by safety points incorporated in the feed train which, while simple, are very efficient.

Micrometer index dials graduated to thousandths are adjustably mounted on each feed rod and a decidedly neat scheme has been worked out in connection with them which renders simple the reproduction of various diameters and sizes and at the same time does not present the limitations, mechanical and otherwise, of the automatic knock-off. It consists of indicators numbered to correspond to the turret faces which are set to the proper micrometer reading as the correct dimensions of the first piece are reached. Calipering and measuring for depth are thus obviated on all but the first piece.

The handling of the main head by power for rapid movement is conveniently obtained through the key-handles M shown at the right end of the cross rail, which operate plungers passing entirely through the feed rod and screw and actuate clutches in the boxes shown at the opposite end of the rail. This mechanism is driven from the first motion shaft and its speed is constant and has no relation to the speed or movement of the table. The maintenance of the turret alignment

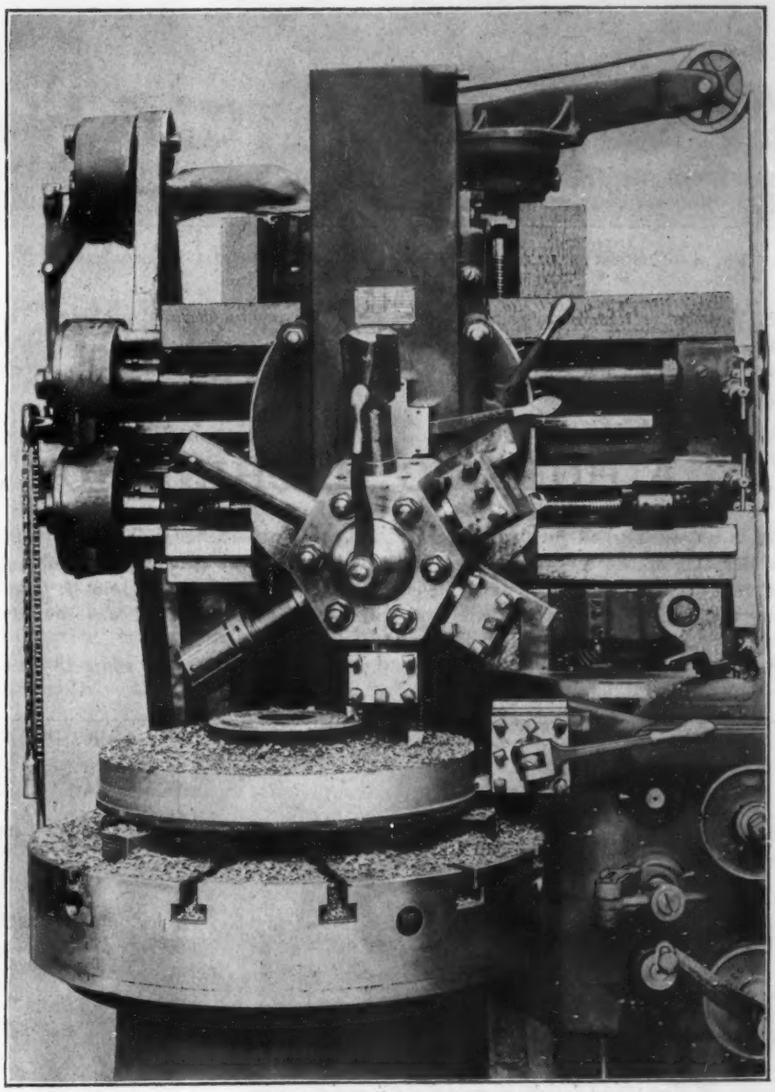


FIG. 3.—OPERATION IN VERTICAL TURRET LATHE, THREE SURFACES BEING CUT AT THE SAME TIME.

has been effectively solved by placing adjustable taper gibs on both front and back bearings—the saddle being solid square locked throughout. The rails, both cross and vertical, are practically a unit and may be adjusted vertically, by power, to obtain the greatest efficiency of slides on work of varying lengths.

Fig. 4 shows the friction clutches used throughout the machine. The spider is keyed to the shaft and the gear revolves freely thereon until the friction is engaged by forcing out the pin which actuates a spring lever. While this type of friction is practically self adjusting, the small wedge shown at the fulcrum point has recently been added rendering easy the adjustment should any be required.

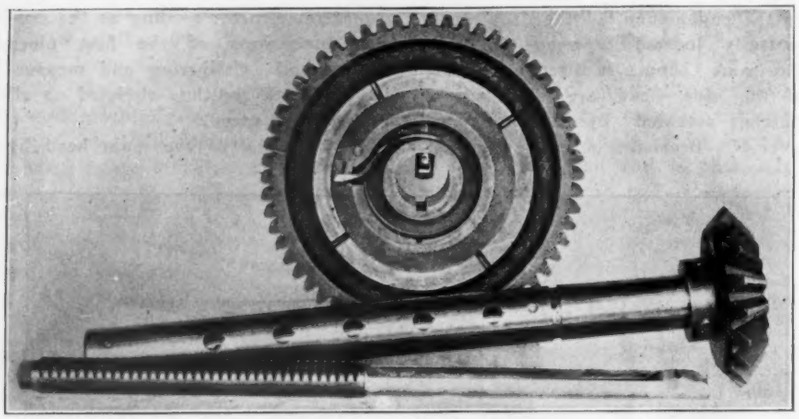


FIG. 4.—CONSTRUCTION OF FRICTION CLUTCHES IN VERTICAL TURRET LATHE.

Lubrication of all parts subject to wear has received careful attention. All gearing remains in a constant bath of oil, gages being conveniently placed which indicate the proper level to be maintained.

The attached table shows some of the principal dimensions of the machine:

Maximum diameter of work	36	inches
Maximum height of work	24	"
Number of table speeds	15	
Vertical adjustment of rails	12	"
Diameter of main turret	12	"
Number of holes	6	
Diameter of holes	2½	"
Horizontal movement of side head	15	"
Faces on side head turret	4	
Number of feed changes	8	
Range of feed changes	1-96—½	inch
Range of thread cutting attachments	2—14	per inch
Diameter of driving pulley	24	inches
Face of driving pulley	3	"
Horsepower of motor	7½	
Floor space required	65 x 70	"
Net weight	11,300	pounds

A HOBBING MACHINE FOR SPUR GEARS

It is an established fact today, that the demand in the mechanical field is for speed and accuracy, and it is true that in this country there has been, until recently, no departure from the rotary, reciprocal cutting and intermittent indexing machines for spur and spiral gears. The hobbing machine brought out by John J. Grant in 1900 for worm gears, was the first departure.

Mr. George B. Grant, some 18 years ago, did take United States letters patent on a machine having the principle of cutting gears with a hob, but no commercial results ever appeared from this, and the machine here illustrated is practically the first one man-

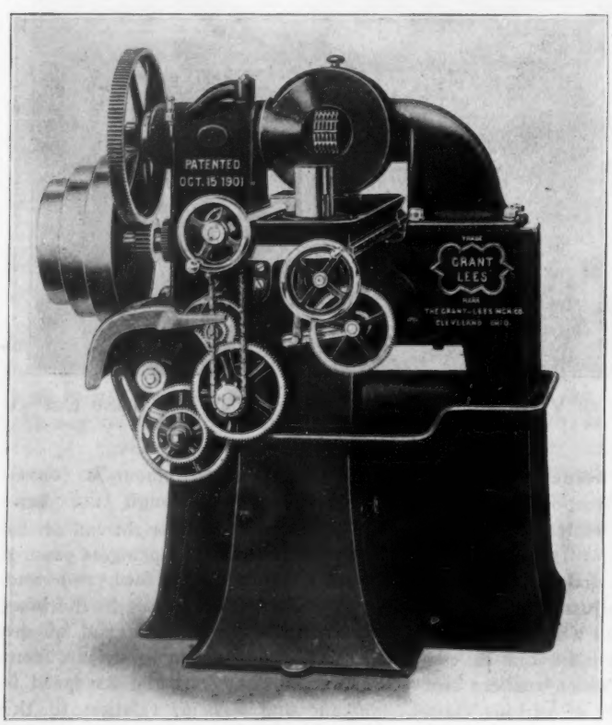


FIG. 1.—FRONT OF GRANT-LEES GEAR CUTTING MACHINE.

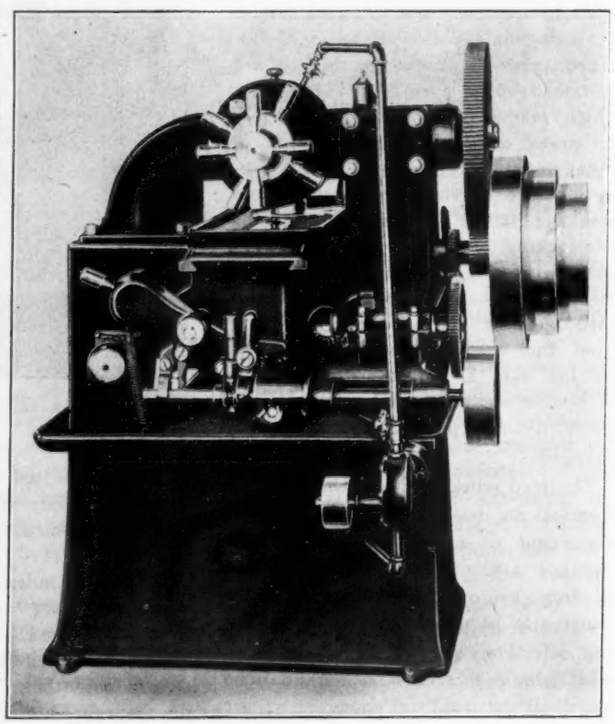


FIG. 2.—BACK OF GRANT-LEES GEAR CUTTING MACHINE.

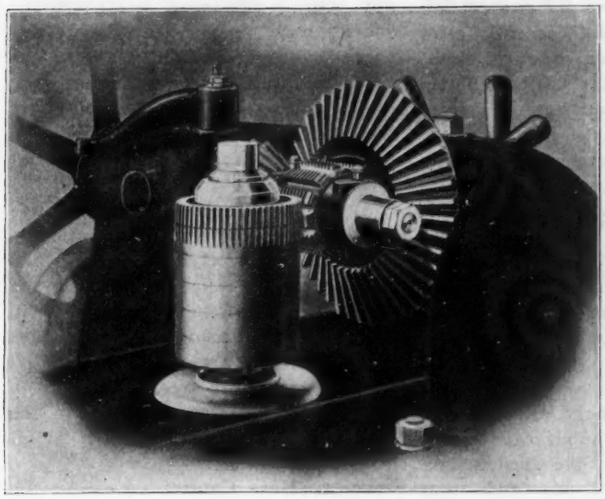


FIG. 3.—CUTTING SPUR GEARS.

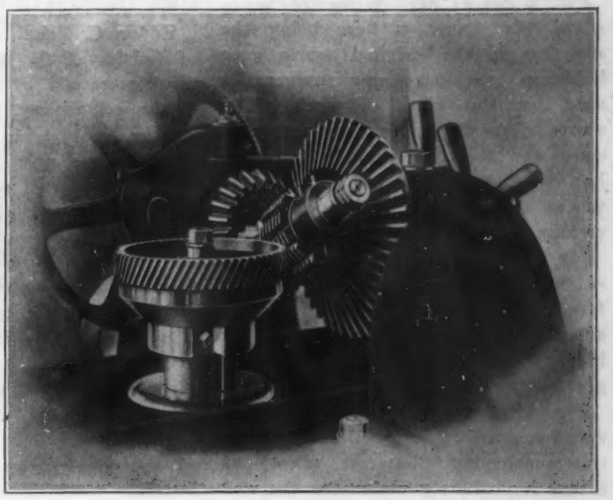


FIG. 4.—CUTTING SPIRAL GEARS.

ufactured in the United States and offered commercially.

This machine is the result of the combined effort of E. J. Lees and John J. Grant. Fig. 1 shows the front of the tool and brings out the stiffness and rigidity of the machine and emphasizes the general resemblance to a Lincoln type miller. A noticeable feature is the absence of overhang in the cutter head.

The work is set on a hardened and ground tool steel arbor in a vertical traveling spindle, which rotates and has a horizontal movement as well, controlled for the diameter of the gear and the depth of tooth by micrometer adjustment.

The power comes from the cone pulley through a pinion to the main spindle gear, thence from the main spindle bevel pinion to the transmitting idler bevel gear and from that to a swivel arbor bevel pinion, which in turn drives the cutter. By this arrangement of gearing the cutter may be set and driven at any angle, for spur gears the angle being the same as the lead of the thread of the cutter. Fig. 2 is a rear view with the origin of the automatic quick return power, this latter being the pulley below the main driving cone.

Fig. 3 shows the machine cutting spur gears. For cutting spur gears of the involute system, the hob type of cutter, having the profile of the cutter teeth the same as a rack, is particularly adapted as illustrated in Fig. 7.

There are several advantages in generating teeth in this way. One cutter only is needed for each pitch, cutting all gears from the lowest to the largest number of teeth. The fact that all gears of a given pitch are cut by one correct hob, eliminates the errors which arise from incorrect curves in the old style cutter with the curves approximated for a given number of teeth; furthermore, that as the work is continuously rotating while being cut the heat is uniformily distributed, and the hob passing between and over all the teeth makes it impossible for a gear cut on this machine to have fat or thin teeth, the cutter and blank being geared together at a given ratio by the change gears on the cone side of the machine.

Fig. 4 shows the machine cutting spiral gears. The same cutter for the normal pitch of the spiral is used as in cutting spur gears of the same pitch, but in this case the change gears in front of the machine are set in conjunction with the rotating gears on the cone side of the machine to give the correct angle of spiral.

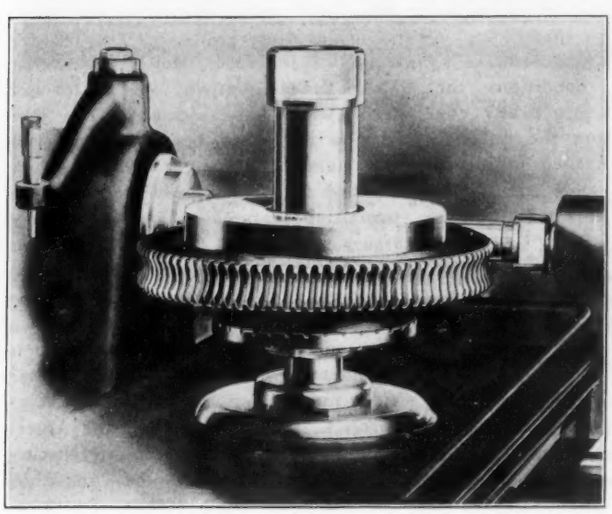


FIG. 5.—CUTTING WORM GEAR.

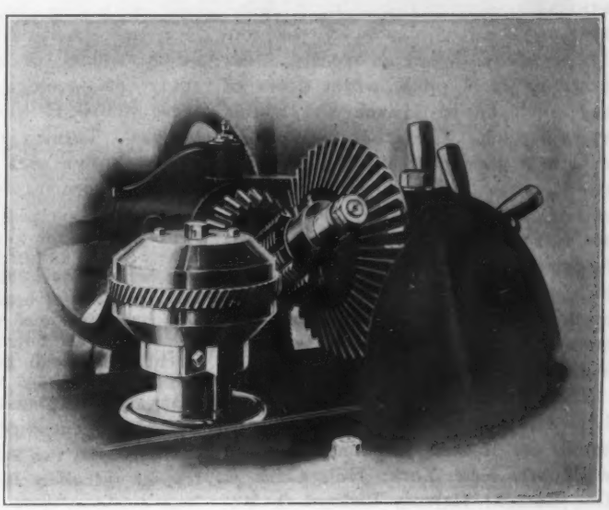


FIG. 6.—HOLDING NARROW FACED GEAR.

Fig. 5 shows the cutting of worm gears, the operation here being the same as in the original worm gear hobbing machines now universally used for this class of work. The worm gear blanks revolve automatically and feed horizontally into the hob until the proper center distances are obtained, and no previous nicking of the blank is required.

Fig. 6 illustrates the method used in holding and rotating a narrow faced gear having a small bore, the arbor only being used to center the blank. The drive is from the support rigidly attached to the spindle.

Fig. 8 shows an automatic steady rest for gears of larger diameter. By this mechanism the rest takes the thrust immediately under the cut and moves in union with the main spindle.

The machine is automatic to the extent that work is fed through the cutter, stopped, returned to its original position, stopped, and a gong sounded to announce completion of the job. The capacity of the machine is spur gears up to 4 pitch, worm gears of any pitch up to ¾-inch and spirals up to 4 pitch. The arbor will accommodate a gang of gears or a gear up to 6 inches face. There are three cutting speeds available, 29, 52 and 84 feet per minute. The vertical feeds are 1/16-inch, 1/32-inch and 1/64-inch per revolution of blank. The machine weighs 1,750 pounds and requires a floor space of 4 feet by 4 feet 6 inches.

The machine is built by the Grant-Lees Machine Co., Cleveland, and the agents for it are: Manning, Maxwell & Moore, New York; Hill, Clark & Co., Boston; Harron, Rickard & McCone, San Francisco.

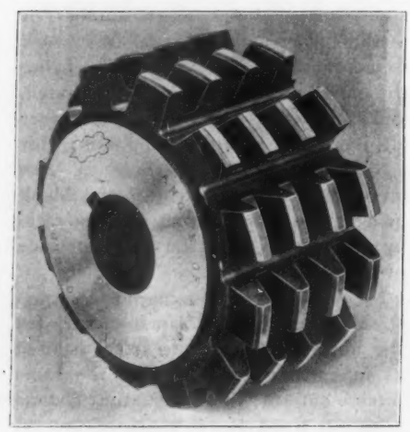


FIG. 5.—HOB.

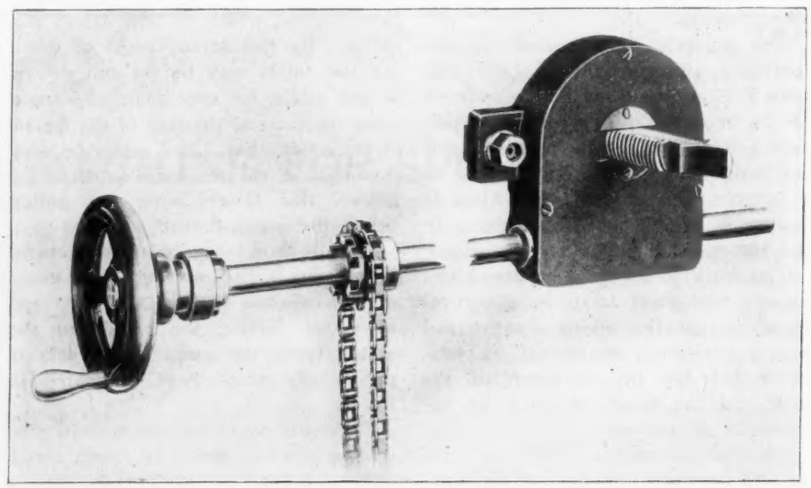


FIG. 8.—AUTOMATIC STEADY REST.

ORE DEPOSITS OF THE SOUTH.

Edwin C. Eckel, until recently chief of division of the iron ores and structural materials of the United States Geological Survey, but now in private practice, presents in the *Manufacturers' Record* some very interesting facts regarding the great possibilities of iron-making in the south. Mr. Eckel calls attention to the fact that about a year ago, basing his estimates on careful field work, he figured that in Alabama alone there are about 1,000,000,000 tons of red ore above the 1,000-foot level, and to this he adds: "That this statement was decidedly conservative will be proven when the United States Geological Survey publishes the results of our work in the Birmingham district." Mr. Eckel also adds that confining his estimate to the ore above the 1,000-foot level was not in any way whatever with a view to questioning the continuity of the ore beds at greater depths, for even before the discovery made by drilling near Birmingham, he was satisfied by study of geologic conditions that these ore beds were practically continuous. Turning from the red ores to the brown ores needed in mixing with the former, he adds:

This situation adds very greatly to the importance of the gray ores of Talladega county for a mixture with the limey red ores, since the gray ores as a mixture can take the place of brown ores, and experts who have examined the gray-ore district thoroughly report that the quantity is sufficient to meet all possible needs of the future.

In discussing ease and cheapness of assembling the various raw materials that give to the southern iron industry its peculiar advantages over the iron trade of any other part of the United States, Mr. Eckel says "that the south possesses an advantage which could hardly be counterbalanced by any possible difference in grade of ore. As a matter of fact, the ores now used in the south are not strikingly inferior in grade to those shipped from the Lake Superior district."

And then discussing the relative valuation of ores, and commenting on the price of $1 a ton, now accepted as the basis of value of "ores in the ground" of the Lake Superior district, he says: "It is obvious that such differences cannot always exist, and that in the near future we may expect to see a remarkable appreciation in the value of good southern ores."

Under New Control.—*American Industries*, the publication of the National Association of Manufacturers, is now appearing under new editorial control. Atherton Brownell, president and editor of the Century Syndicate, 41 West 34th street, New York, is editor, with Henry Harrison Lewis, well known as a foreign trade writer, as associate. The size of the page has been changed and the number of pages increased, in addition to other improvements. Some promising features to appear in early issues include the following articles: On American trade in Japan, China, Italy and Austria-Hungary, by Thomas F. Millard; on tariff and reciprocity relations, by Nicholas Murray Butler, president of Columbia University; various merchant marine topics, by Winthrop L. Marvin, author of the American Merchant Marine; tariff discussions, by Franklin Pierce; on labor conditions, by Dr. Samuel G. Smith, of the University of Minnesota.

SOME NOTABLE INSTALLATIONS OF SHEPARD CRANES

The accompanying illustrations show interesting applications of the electric traveling crane to the transportation of raw and bulky finished materials in three eastern manufacturing plants. The installations are all relatively recent, and in each instance the Shepard crane, built by the General Pneumatic Tool Co., Montour Falls, N. Y., is employed.

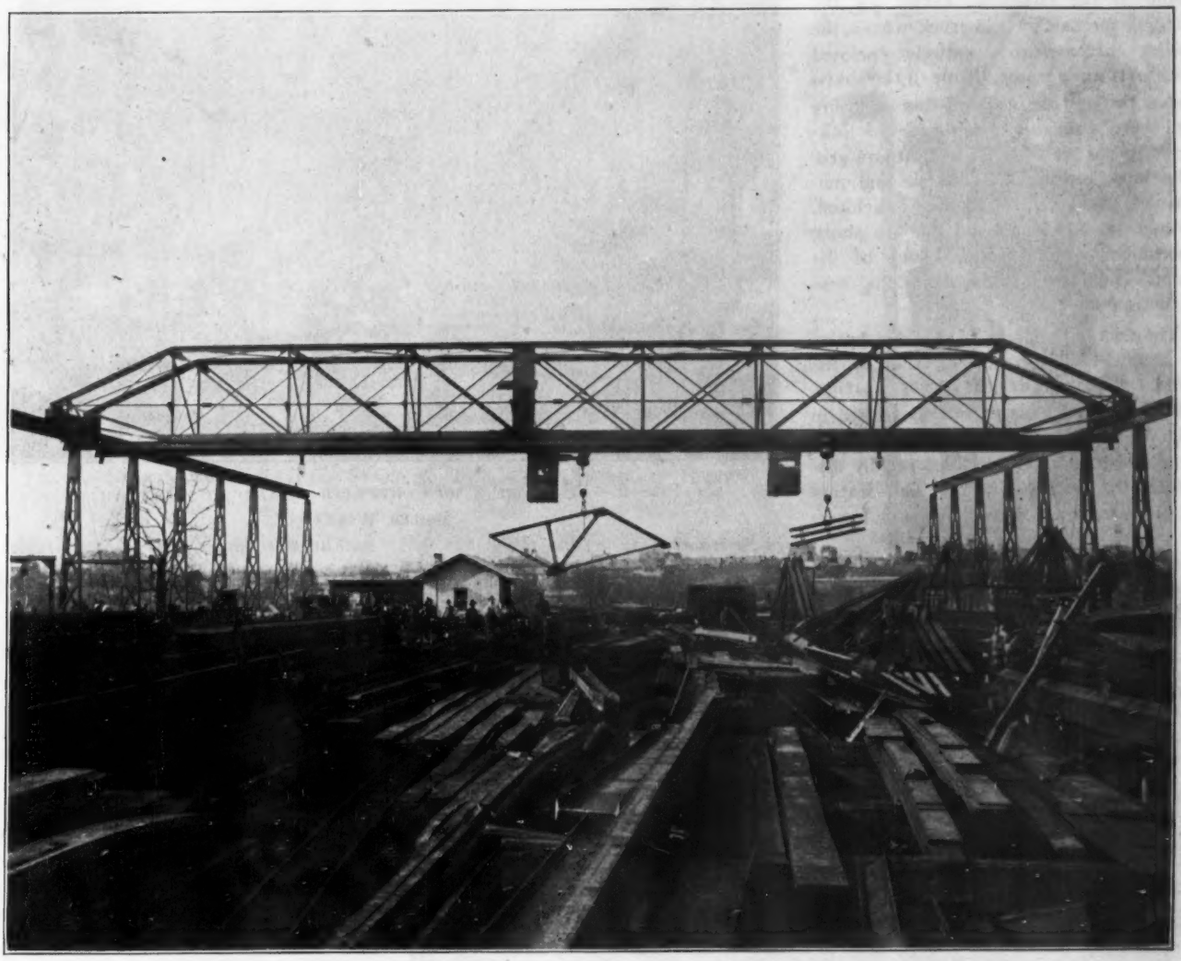


FIG. 1.—SHEPARD CRANE WITH SPAN OF 115 FEET AT WORKS OF YORK BRIDGE CO.

At the plant of the York Bridge Co., York, Pa., the chief requirement to be met was the designing of a crane to serve an extensive yard and handle not only the usual run of beams, channels and other shapes, but the more unwieldy built-up sections as well. To accomplish this the 10-ton, motor-driven, transfer bridge shown in Fig. 1 was constructed, its most remarkable feature being its span of 115 feet. This bridge is equipped with two cage-controlled Shepard electric traveling hoists, running independently. In one case three controllers are provided, two governing the trolley and hoisting motors and the third operating the bridge; the other hoist lacks the bridge-controlling mechanism, which, if duplicated, would be an obvious source of confusion. The hoists are each of five tons capacity and are so arranged as to run very close to the ends of the bridge, this being necessary to command a railway switch entering one extreme edge of the yard. As is usual for outdoor work, the cages for the operators are enclosed and two electric arc lamps, suspended from the bridge at convenient locations, insure ample lighting for that section of the yard immediately below.

A traveling crane of similar capacity but of much narrower span, 50 feet, has been erected in the yards of the Coatesville Boiler Works, Coatesville, Pa., and is shown in Fig. 2. That side of the crane runway adjacent to the operator's cage is close to one of the buildings of the plant, but on the other the serving area of the crane is considerably increased by the fact that an extremely close approach to the runway is possible, thus allowing the placing of materials somewhat beyond the normal limits of the yard. In this installation, also, the cage is enclosed, being fitted with windows on three sides. A foot walk, affording the operator easy access to the bridge motor, gearing, bridge brake, shaft bearings and crane trolley, extends a considerable distance along the further girder shown in the illustration.

At the plant of the Abendroth & Root Mfg. Co., Newburg, N. Y., manufacturing spiral riveted pipe, water tube boilers and similar products, a Shepard crane installation serves a variety of purposes. As shown in Fig. 3, a crane runway at the left spans an elevated railway spur and is used for loading and unloading, a two-ton traveling crane being employed for this purpose. From the outer rail of the runway is suspended a single I-beam runway on which is mounted a two-ton,

two-motor, cage-controlled electric hoist. This carries raw materials about the plant and collects the finished products, depositing them just below the crane for loading into cars. The method of supporting the hoist runway is noteworthy and the entire system is one of speed and convenience. The hoist runway extends over a Hudson river dock for loading and unloading.

A feature of the Shepard crane is found in the fact that, except for the winding mechanism and truck wheels, the trolley mechanism is entirely enclosed within its main frame. None of the shafts passes through the walls of this enclosure and there is thus no opening for the leakage of oil or the entrance of dust and grit. The hoist gearing and electric and mechanical brakes are likewise enclosed, with a constant supply of oil. In short, perfection of lubrication is one of the points emphasized throughout the construction of this crane.

The friction surfaces of the load brake, of bronze and iron, are mounted in the same enclosure as the hoist gearing, where they are thus constantly bathed in oil, the circulation of which distributes over a large surface and thus rapidly dissipates the heat generated. This feature is of importance, inasmuch as in lowering about 80 per cent of the work done by the motor in hoisting is given out in the form of heat, nearly all developed on these surfaces. These are at rest while the load is being elevated, the hoisting motion taking place independently and not being transmitted through the brake.

The electric brake, provided to bring the hoisting motor promptly to rest as soon as the current is cut off, is not connected to the motor but to an extension of the motor pinion, leaving the motor free of complications and insuring the prompt action of the brake. A limit switch automatically opens the circuit to the hoist motor when the hoist hook reaches its upper limit of travel. A foot brake, automatically set when the crane is not in use, prevents it drifting with the wind, a frequent difficulty with yard cranes.

FIG. 2.—TEN TON CAGE-CONTROLLED CRANE AT COATESVILLE BOILER WORKS.

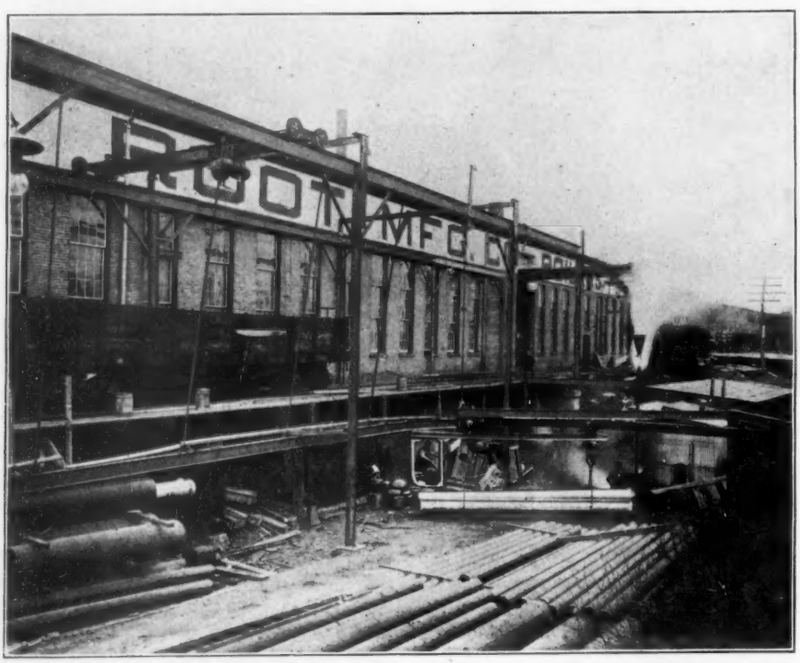


FIG. 3.—COMBINATION OF CRANE AND HOIST AT WORKS OF ABENDROTH & ROOT MFG. CO.

A PITTSBURG VISE WITH PIPE ATTACHMENT.

The accompanying illustrations show a combination machinist's and pipe fitter's vise recently developed by the Pittsburg Vise & Tool Co., Pittsburg. All such tools usually have had the pipe jaw located in the throat of the regular jaw. This sometimes interfered with the operation of the vise when working with the machinist jaw, as the pipe jaws protruded considerably into the throat of the vise. It also limited the capacity of the pipe which the vise could handle.

An attempt has been made to eliminate these objections by utilizing the rear of the draw bar instead of the throat of the vise, as shown in the accompanying illustrations. To the end of this bar is fitted a casting to which are attached pipe jaws made of tool steel, forged and oil tempered. A small lug screwed in the rear of the vise directly under the slide bar permits the reception of one link of a chain.

The casting being placed in position on the rear of the vise, one end of the chain is made fast to the lug by a pin. The pipe is placed in the jaws,

the chain thrown around it and a link dropped into the lug on top of the casting. A half turn of the main screw of the vise throws the drawbar back, tightening the chain around the pipe and locking it against any rotation.

In this vise, as in all others of the Pittsburg type, the swivel in the base of the vise is locked automatically when the pipe is locked. This makes it possible to hold work on the outside of the bench by loosening the screw and swiveling the vise. The pipe attachment can be left in place as long as needed and does not interfere with the machinist jaws of the tool. It can, however, be removed by removing a pin, which releases the chain as well as the casting. An unlimited jaw capacity is secured, as there is nothing to prevent the making of the pipe jaws any size desired. Furthermore, owing to the swiveling feature, the vise can be placed in the most advantageous position for the operator. There is no possibility of crushing the pipe, which is prevented by the use of a chain of limited tensile strength, which will break before the crushing strength of the pipe is attained.

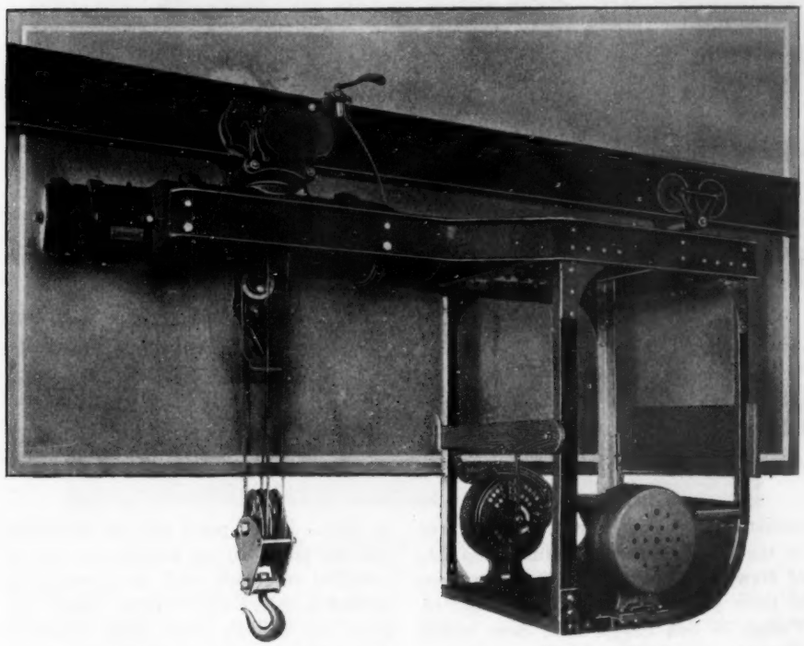


FIG. 4.—NEAR VIEW OF SHEPARD STANDARD TYPE CAGE-CONTROLLED HOIST.

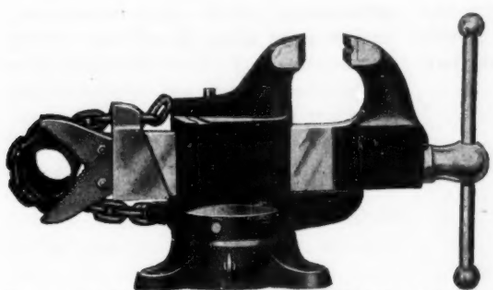


FIG. 1.—THE PITTSBURG COMBINATION VISE.

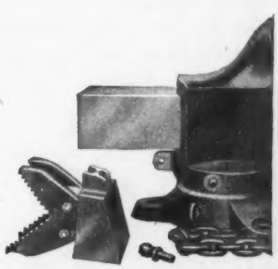
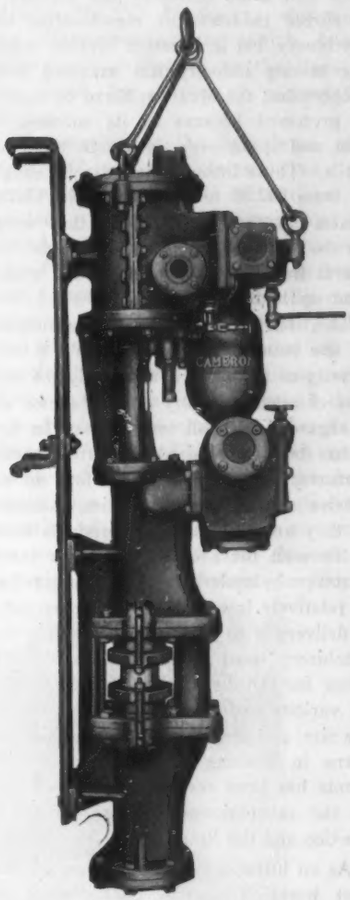


FIG. 2.—PIPE-FITTER JAWS AND ATTACHMENTS OF PITTSBURG COMBINATION VISE.

Making Pipe.—The National Tube Co. has issued an elaborately illustrated booklet edited by F. N. Speller, metallurgical engineer, describing the manufacture of welded pipe from the ore to the finished product. In writing and illustrating this work, Mr. Speller has treated his subject in popular style, the object being to familiarize users of pipe with the properties of the materials involved and their treatment in the course of manufacture.

TRANSPORTING MINE MACHINERY IN ROUGH DISTRICTS.

In their search for new markets, American manufacturers for some time have naturally turned their attention to South and Central America and have devoted particular study to the possibilities and requirements of these rich but comparatively undeveloped countries. Of late years they have found these districts increasingly profitable as a place for marketing their products, this being explained partly by their rapid development but more particularly by the fact that these countries more and more every year are attracting American capital. The most promising line of activity, of course, is mining, as is evidenced by a recent report of the United States Consul General of Mexico to the effect that in the last four years $125,000,000 of American capital has been invested in the mines of that country alone, while reports from many sections of Central America and the Southern continent are of similar import.



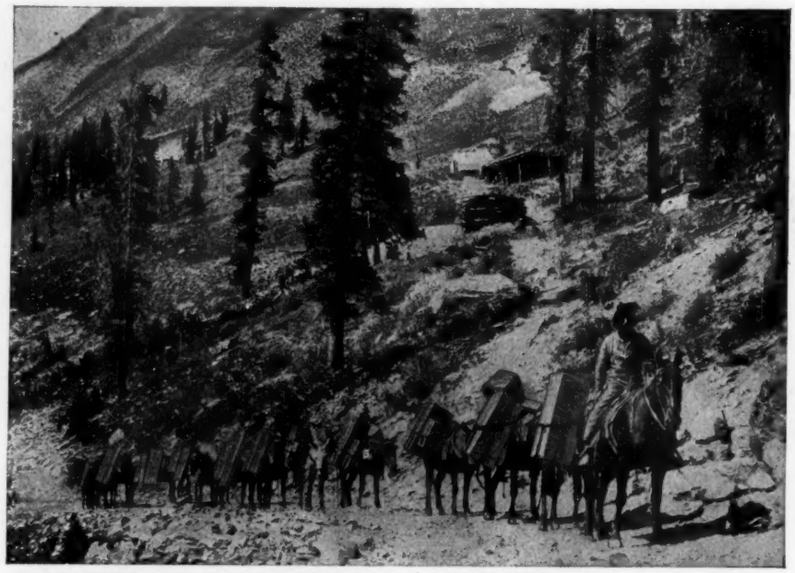
CAMERON VERTICAL PLUNGER SINKING PUMP.

While it is true, however, that mining is commonly the pioneer in the industrial development of these regions, it is also

true that in the trail blazed by it a variety of activities follows closely. Other resources are discovered and worked, settlements, mining camps and towns spring up to create new needs and other industries are soon established to supply them. At the outset naturally, and frequently for a long period thereafter, the chief difficulty encountered is that of crude, inadequate and costly transportation facilities. In some instances the ox-cart is employed to transport merchandise and machinery, but in Western Mexico, where the mining industry has assumed large proportions, the Mexican burro or donkey is preferred because of its sureness of foot and speed over the rough mountain trails. These little animals can be bought at from $12.50 to $20.00 each in United States currency, and, though they weigh on an average about 500 pounds, can travel from 20 to 40 miles a day with a load up to 300 pounds.

This burro method of transportation in the more inaccessible regions is not a novelty or a fad; it is absolutely the only way of reaching many isolated mines and is regarded with all seriousness. In fact, it has been recognized by certain manufacturers of machinery who find an extensive sale in these countries, inasmuch as they are building their products so as to fit with these conditions. For transportation by mule-back the maximum load is relatively low and cannot be exceeded if delivery is to be made; this means that machinery must be so constructed as to allow for the dismantling and division of its various parts into packages of moderate size, and the enterprise of certain concerns in meeting these unique requirements has been rewarded by heavy sales to the mountainous mining districts of Mexico and the South.

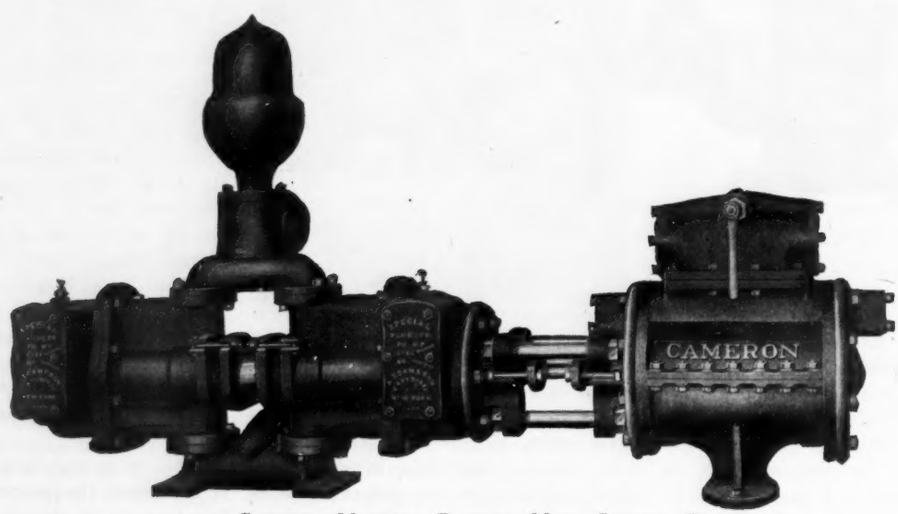
As an instance of this practice, we present herewith several photographic reproductions of mule teams loaded with sectionalized steam pumps manufactured by the A. S. Cameron Steam Pump Co., of New York, together with illustrations of these pumps after they are assembled. Pumps of this design have been widely adopted in mountainous regions and have found their way on mule-back or by even more primitive modes of transportation over the mountain passes and terraced ranges of our own country and old Mexico, Colombia, Peru and Chile, as well as into other mining regions of Central and South America.



ROCKY MOUNTAIN MULE TEAM LOADED WITH MINING MACHINERY.

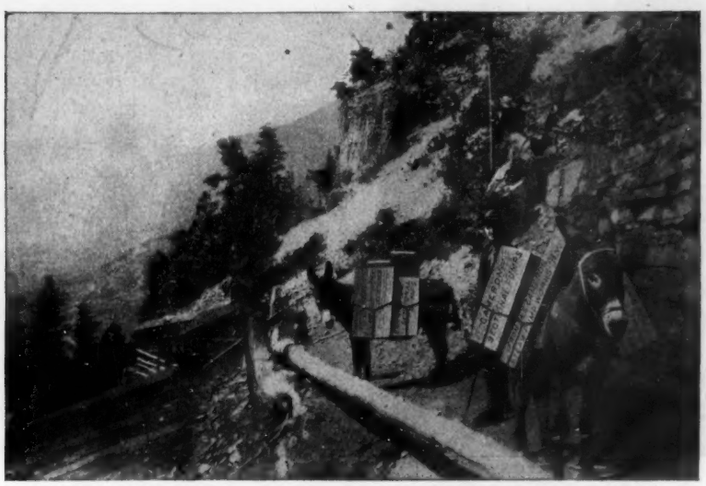
These mine pumps are built for rough service and heavy work, but are constructed in sections, the parts being so designed and proportioned that the pumps can be taken apart at the bolted joints and packed for shipment. The majority of pieces weigh less than 150 pounds each while the maximum weight, 300 pounds, is rarely found and then only in the larger sizes. These parts can be assembled and the pump set up without the aid of a skilled mechanic, and as a precaution against accident in a region where repairs are difficult each pump before it leaves the Cameron works is thoroughly tested to a degree far in excess of its rated capacity.

Another important detail in winning and holding export trade is also emphasized at these works in the way in which shipments are packed. As the pump sections are destined for long journeys, they are strongly boxed and arranged for convenient handling, this being advisable because of the numerous transfers of freight in steamship and railway traffic before they reach their ultimate destination. The arrangements for mule-back transportation are usually made at some convenient point along the railway or other carrier, the burro train of course being



CAMERON MANITOU PATTERN MINE STATION PUMP.

used over as short a distance as possible. Where the route is particularly long or difficult the loads are lightened as much as is practicable; oftentimes the boxes may be discarded entirely and the machinery fastened on the back of the burro without covering or enclosed only in bags. Occasionally it is found necessary in extremely rough country, to swing the load between two mules driven tandem style. On the return journey, the burro is ordinarily loaded with ore contained in leather bags.



MEXICAN BURROS ON A MOUNTAIN TRAIL.

These details of one of the methods employed to cater to the peculiar needs of an undeveloped country are interesting as directing attention to the many similar problems involved in any campaign of manufacturers of machinery or mine equipment for export trade.

In connection with the construction of the new Pacific coast extension of the C. M. & St. P. Ry. there is being developed the most extensive hydro-electric power system in the west; 120,000 kilowatts will be eventually generated by water power. Eleven great dams varying from 20 to 60 feet in height will be constructed across the St. Joseph river between the towns of St. Joe and North Fork. Part of the energy generated will be used to operate the St. Joe division of the C. M. & St. P. including the 8,000 foot Bitter Root tunnel. This will be the first stretch of heavy trunk line railway, outside of a few terminal developments in the east, to be operated entirely by electricity. High tension transmission lines will be built to Spokane and other points and a large amount of the power will be used for general industrial purposes.

REPAIRING A LARGE FURNACE CRANK SHAFT WITH THERMIT.

One of the most important repairs that has been made by the thermit process recently was that of the 9-inch crank shaft of a heavy duty pumping engine belonging to the Wharton Blast Furnaces, of Wharton, N. J.

The fracture first appeared on one side of the web of the crank, but upon examination it was discovered that the other side of the web was also fractured and that it would be necessary to make two welds in order that the shaft might be rendered as good as new.

The repair was effected by representatives of the Goldschmidt Thermit Co., New York, who proceeded to line up the shaft on a cast iron base plate fitted with "V" blocks, as shown in the illustrations, after which 1-inch holes were drilled along the lines of the break by means of compressed air tools.

The section at the first break was 4 ins. x 12 ins. and formed an exceedingly large steel section to be welded, the operation requiring 250 pounds of thermit, with which were mixed 50 pounds of steel punchings and 5 pounds of pure metallic manganese. In effecting the repair, after the fracture had been opened up as described, a matrix of yellow wax, of the exact shape of the desired thermit steel reinforcement, was built upon the shaft. This is shown quite clearly in Fig. 1. It might be here stated that in order to determine the quantity of thermit required to make the weld, the wax used for the matrix is weighed and its weight in pounds

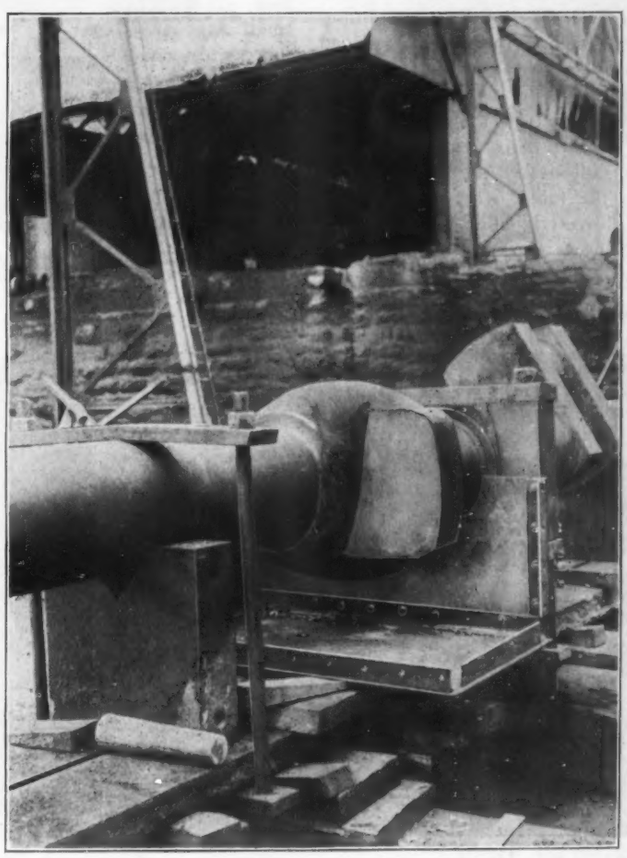


FIG. 1.—WAX IN POSITION BEFORE MOLD BOX WAS PLACED ABOUT IT.

multiplied by 32 gives the number of pounds of thermit required.

With the shaft lined up and the wax in place, it was necessary to surround it with a mold, the principle guiding the construction of which is to enable the thermit steel to run through a gate to the lowest point and rise through, and around, the parts to be welded and into a large riser.

The wax, of course, acts as the pattern, but it is necessary to construct patterns for the gate and riser of wood. Furthermore, a small hole must be left at the bottom of the mold, to enable the wax to run out when heated, thus leaving the mold ready for pouring.

When the patterns for the gate and riser were in position, a mixture of molding sand and fire-clay was tamped firmly into the mold box, after which the gate and riser patterns were withdrawn and the flame of a strong blow-torch directed into the hole at the bottom. This melted out the wax, and the heating was continued until the parts to be welded were brought to a bright red heat. When this had been accomplished, the hole at the bottom was closed up with a sand core and backed up with a little sand. The mold was then ready for casting.

While the parts to be welded were being heated, the crucible containing the 250 pounds of thermit was placed in position above the gate of the mold, and as soon as the torch had been withdrawn and the hole plugged up, the thermit was ignited and the resulting superheated thermit steel tapped into the mold, where it occupied the space formerly filled with the wax.

Fig. 2 shows the shaft with wax in place and the mold box partly assembled.

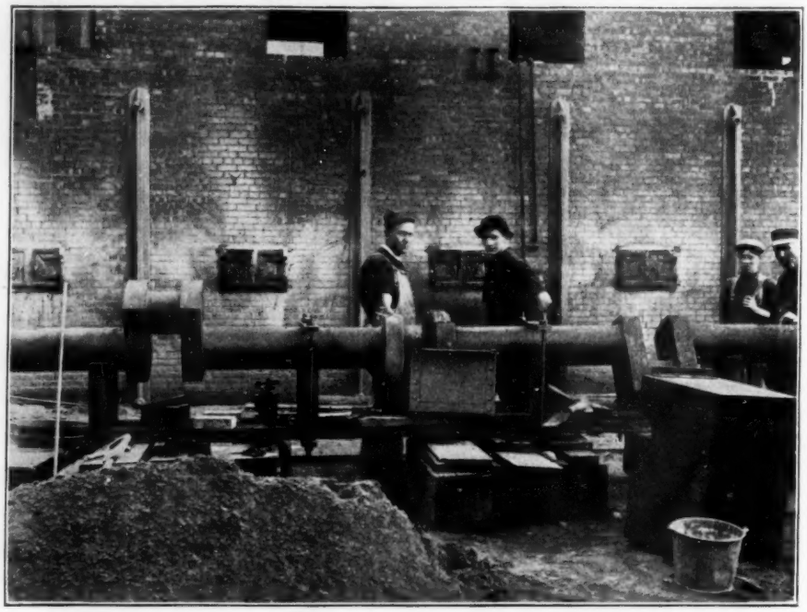


FIG. 2.—SHAFT WITH WAX IN PLACE AND MOLD BOX PARTLY ASSEMBLED.

In Fig. 3 the mold box and crucible are shown in position, while Fig. 4 shows the two finished welds before knocking off gates and risers.

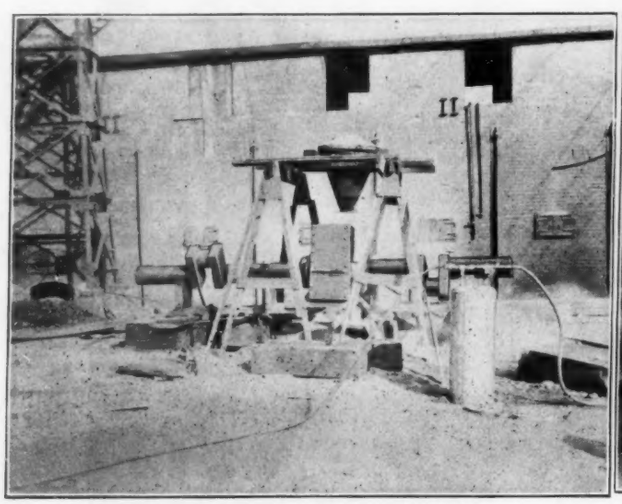
The second weld was effected in the same manner as the first and the two together enabled the saving of a valuable crank shaft, at comparatively small expense. After the welds had thoroughly cooled, holes were drilled through the gates and risers, thus enabling their removal. The finished job is shown in Fig. 5.

The Automatic Gin Tender Co., Dallas, Tex., has changed its title to the Dallas Gin & Foundry Co., and increased its capital stock from $30,000 to $60,000.

ARCHITECTS DISSENT

From the Opinion that Skyscrapers Are a Menace to New York.

George W. Babb, president of the New York Board of Fire Underwriters, whose views concerning danger to financial district of New York city on account of the skyscrapers, were published in THE IRON TRADE REVIEW of Sept. 19, has aroused considerable discussion. Many builders and architects do not agree with his belief that lofty buildings, in themselves fireproof, can help on a conflagration. They say, on the other hand, that the more fireproof buildings there are—and every skyscraper put up these days is fireproof—the less liable is the congested down-town section to be devastated. In effect, they say, every fully protected



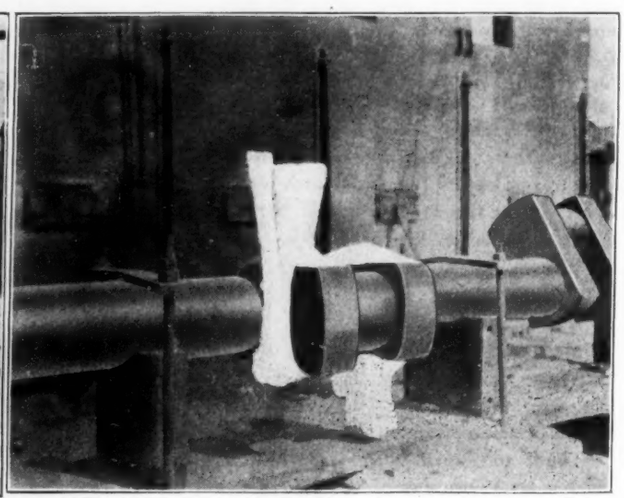


FIG. 3.—MOLD BOX AND CRUCIBLE IN POSITION READY TO POUR. FIG. 4.—FINISHED WELD BEFORE GATE AND RISERS WERE CUT OFF.

structure is a barrier to the spread of heat and flames.

Nicholas Le Brun is architect of the building that is to be the highest in the world, even higher than the Singer building. This record-breaker-to-be is the tower of the Metropolitan Life Insurance building, at Madison avenue and Twenty-fourth street. It will have forty-eight stories above ground, and two below ground, fifty in all. This is what Mr. Brun says:

"In my opinion, Mr. Babb's idea is a mistaken one. He is undoubtedly sincere, but thorough study of the structural qualities of the modern high building should convince any man that the skyscrapers are a hindrance to fire. The science of fireproofing has reached such perfection in New York that there is almost no chance of a disaster in the down-town district—that is, as far as high buildings themselves are concerned. More and more the trimmings, and even the contents of buildings, are being made fireproof. That window sill," Mr. Le Brun pointed toward the window near his desk, "is metal and cannot burn. Look at that cabinet of drawers; that is made of metal, too. Walls and floors are made of material that is unburnable.

"In a thoroughly fireproofed building, if a fire started, it would be confined to one room, or to one floor at most. It could not reach another building. Besides, with the new high pressure water mains water can be poured on the fire, no matter how far up in the air it is.

"Every floor of the best type of skyscraper is equipped with standpipes and hose. Far from being a danger, I should consider a high building a help, since water could be poured out of its upper windows upon a fire."

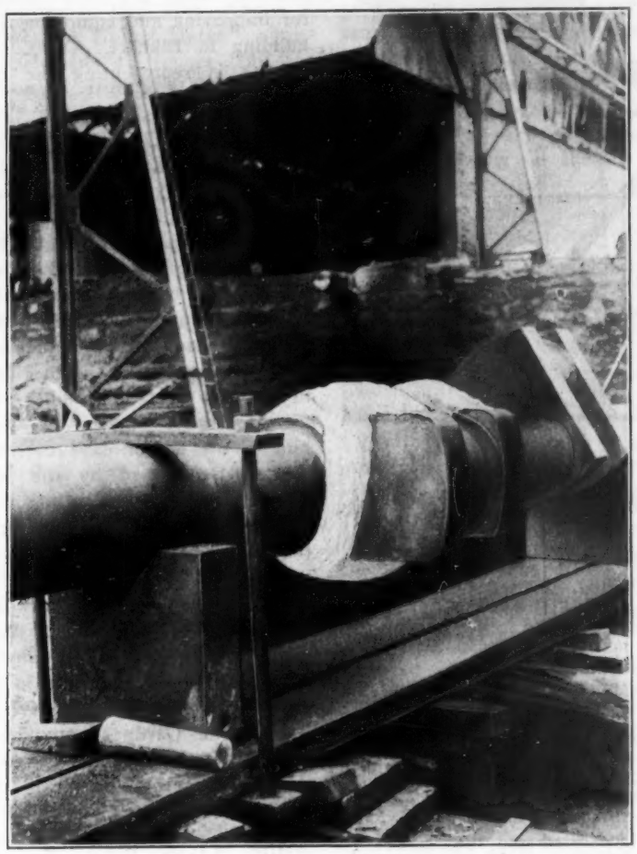


FIG. 5.—FINISHED WELD AFTER GATE AND RISERS WERE CUT OFF, SHOWING HOW WAX HAS BEEN REPLACED WITH STEEL.

Paul Starrett, of the Fuller Construction Co., perhaps the largest building concern in the metropolis, says:

"I am surprised that Mr. Babb, familiar as he should be with the records of great fires, could have made the assertion that the modern high building is dangerous as a fire risk. All experience has proven the opposite; it has been the skyscrapers that have stopped the spread of fires—that have stayed where every other building passed away."

The highest building now standing is the Singer. Not yet finished, it already overtops the hitherto record-breaker, the Park Row building. The architect is Ernest Flagg. Some years ago, Mr. Flagg opposed the erection of skyscrapers, but now appears as the designer of one forty-seven stories high. He could not stop the skyward tendency, and so he fell in with his brethren. Asked to state what he thought of Mr. Babb's statement, he said:

"I think that Mr. Babb, in some respects, is right. There are high buildings which are not fireproof. There are those which have entirely too much wood in them. And that kind is dangerous. But if a skyscraper has nothing about it that can burn—why, naturally, it can't burn. In designing the Singer building, I was unrestricted as to the materials I should specify, and I selected those that would make the building absolutely safe. Steel and terra cotta hollow tile—that is the combination. The frame, the covering, the floors, the partitions—all of them are unburnable. The window frames and trimmings are metal, too, and cannot take fire. The amount of furniture that is combustible is so small that it is not to be considered. If, by any chance, a flame did start it would not get out of the room where it started. It would have nothing to feed upon."

Mr. Flagg's opinion is that of a host of other architects and builders. "Put up buildings of stuff that can't burn," they say, "and then there can be no danger. Every skyscraper will be a barrier against the spread of a conflagration."

HUDSON'S SNAP BENCH.

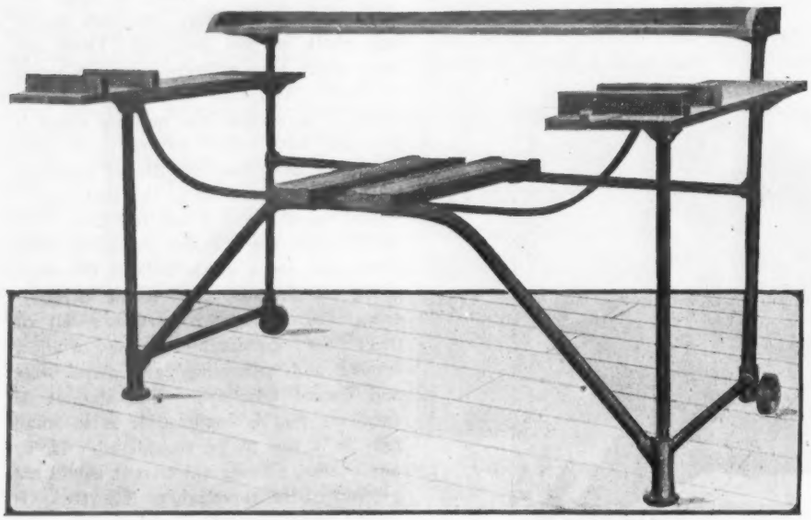
The snap bench shown in the accompanying illustration has been designed by J. M. Hudson, secretary and treasurer of the Piqua Flour Co., Piqua, O. The frame is built entirely of steel tubing and malleable iron castings and the shelves are made of selected lumber. The two center boards on which the molder fills and rams his flasks are provided with four iron strips, each 1¼ inches wide, that prevent the boards wearing off round.

The bench is portable, being provided with two wheels attached to the rear frame, and can be moved to any part of the foundry floor by one man. It is also constructed to conveniently straddle the sand heap, and a single molder can work up the heap on a long floor without the assistance of a helper or another molder to move his bench. Nor is he compelled to remove any of his tools as the top shelf is 12 inches wide and 68 inches long, and provides ample room for his tools and prevents their rolling off when the bench is moved.

The frame is constructed without the use of bolts, nuts, screws or nails, the tubing being threaded and is securely fastened to the castings

and fittings, insuring strength and rigidity.

The working space provided the molder inside the two side shelves is 56 inches which gives the operator ample room even though he is working with a large flask. By the use of this bench it is estimated that the molder's output will be increased at least 10 per cent. The bench is built by J. M. Hudson, Piqua, O.



HUDSON'S SNAP BENCH

FURNACE COMPANY.

Will Locate at Huntington—Engine Plant Reorganized—Indiana News.

(Special Correspondence.)

Indianapolis, Ind., Oct. 1.—Through the efforts of citizens who subscribed $50,000 to a "boom fund," the Chappell Furnace Co., of Morenci, Mich., will move to Huntington, where its name will be changed to the Majestic Furnace and Foundry Co. The company is to be reorganized immediately with $30,000 capital, $20,000 of which will be subscribed by Huntington business men and the balance retained by Morenci capitalists. In addition to manufacturing furnaces and coal chutes, as in the past, a foundry and machine shop will be established. A new factory will be built and equipped at once.

The Anderson Forging Co. will dismantle its plant in that city and remove to Indianapolis, where a factory building is being erected which will cost $12,000.

Lemuel E. Kimberlin, of this city, has been appointed receiver for the Williams Pump Co. on the petition of Knight & Jillson, who contended that the company was in immediate danger of insolvency. The receiver filed a bond of $4,000 and immediately took charge of the company's business affairs.

Notice has been filed by the Banting Machine and Supply Co., Toledo, that it has opened a branch in this state, with Carl Yaple, of Ft. Wayne, as its Indiana agent. The company states it has $150,000 capital stock, $3,950 of which is invested in Indiana.

The International Engineering Co. has been organized at Ft. Wayne, for the purpose of taking over the patents and business of the Haberkorn Engine Co., of that city. Articles of incorporation, showing $200,000 capital have been filed and the Haberkorn engine patents will be manufactured in connection with the former line of engines. George H. Loesch, Fred D. Hoham, John B. Reuss, W. J. Vessey, W. D. Henderson, F. L. Jones, John A. Shoaff, C. H. Doebler, A. J. Vesey, Aaron Rothchild and C. B. Fitch are the incorporators of the new company.

A recent local concern is the Tubular Stove Co., which has just been incorporated with $75,000 capital for the purpose of manufacturing cooking and heating stoves. Thomas F. Hatton, Francis M. Ingler and Henry W. Hendricks are directors of the company.

About half of the amount due employes of the American Rolling Mill Corporation at Muncie has been paid, checks having been issued to the amount of $9,000, the money being derived from the sale of finished product after the mill shut down. It is said that employes who had enough confidence in the company to file their claims direct, instead of through an attorney, were given preference in the payment.

The Shoemaker Automobile Co., now located at Freeport, Ill., is planning to remove its plant to Elkhart, where special inducements have been offered. Bids are now being asked for improving and equipping a factory building in Elkhart. Dr. C. M. Eisenbeiss is representing the company in that city.

Employes Rewarded.—As an acknowledgment of his appreciation of the services of his employes, Robert W. Gardner, president of the Gardner Governor Co., Quincy, Ill., has personally distributed a considerable sum of money among his men on the basis of $5 for each year's connection with the company. Mr. Gardner has been in business in Quincy since 1857 and many of the workmen who were with him in the earlier days of his career are still employed by the successor to his business, the Gardner Governor Co. All employes who had been with the company one year or more were included in the distribution. Accompanying each contribution was a letter from Mr. Gardner expressing his personal appreciation of the faithful assistance of his employes in promoting the plant to its present successful state. The Gardner company manufactures engine and pump governors, pumps, separators, etc.

Will Adjust Rates.—The Indiana state railroad commission has issued a call to shippers and railroad officials to attend a meeting to be held on Oct. 12, at which the question of a complete reclassification of freight rates will be taken up. So many complaints of shippers being discriminated against have been made that the commission has decided to take the whole question up at once, and if such a course is necessary, order an adjustment of rates on all classes of freight. The hearing will likely last several days and all shippers and railroad men in the state will be given an opportunity to discuss the matter before a decision is reached.

The Michigan College of Mines, Houghton, Mich., on Aug. 31, conferred the degree Engineer of Mines on 42 students, and the degree Bachelor of Science on 31.

THE RAIL PROBLEM FORTY YEARS AGO

The steel rail problem, though it has been the center of popular attention only since it leaped into the limelight early in the year, is in reality as old as the steel rail itself. Before its beginning, the iron rail problem held sway. At the Paris Universal Exposition in 1867, Hon. Abram S. Hewitt was the United States commissioner selected to report "On the Production of Iron and Steel in Its Economic and Social Relations." This report on the Paris exhibits in these lines, supplemented by personal visits of Mr. Hewitt to many European and British plants, was published as a hundred-page pamphlet, an autographed copy of which recently fell into the hands of the writer. The following extracts from its pages are interesting at this time as affording an insight into rail methods and difficulties of forty years ago. Even then, it will be noted, the railways came in for plain-spoken criticism because of their willingness to equip with the cheapest rails available. Mr. Hewitt introduces the subject of rails by referring to the fact that "the day for iron locomotive tyres has passed by, and that it is far more economical, if not more safe to substitute cast steel tyres in every case." Continuing, he says:

The Cost All-Important Factor.

"The same conclusion cannot yet be affirmed of rails, because the interest account, of but little consequence in the case of the tyre, becomes a very serious, and, indeed, controlling element in the case of rails. It may be stated, however, that in all cases where iron rails wear out in consequence of hard service within the limits of duration assigned to a steel tyre, it is quite as economical to use steel rails in lieu of iron ones as it is to use steel in lieu of iron tyres. But, assuming the cost of cast-steel rails to be double that of good iron rails, it is quite evident that there must be a limit in the duration of iron rails beyond which it will not pay the substitute cast steel. This calculation is one which must be made by each consumer for himself, with reference to the available capital at his disposal; but it is safe to declare that on all roads where the iron rail has an average life of ten years, it would not be profitable to substitute cast-steel rails, and so long as the average rate of interest paid by railroads in the United States amounts to eight per cent per annum, it would be found expedient considerably to reduce the limit of ten years above assumed for the duration of iron rails before the substitution of steel rails could be justified on grounds of economy.

Even in England, where capital is superabundant and the rate of interest on long obligations not over five per cent, and the traffic per mile of very large diminsions, requiring, as a general rule, the renewal of iron rails in seven years, cast-steel rails have thus far not been very extensively introduced; and even on the London and Northwestern railway, which owns a mill devoted expressly to their manufacture from Bessemer steel and which, from its enormous traffic, has every inducement to make its road as permanent as possible, the money question seems to check the use of cast-steel rails upon any very extended scale.

Steel Heads on Iron Rails.

And yet the necessity of more durable rails then those generally in use is so apparent that any attempt to secure great durability without much additional cost is regarded with great interest, and hence in the exposition there were many specimens, and from all the leading nations, of iron rails with steel heads. In some cases the material employed for the head was puddled steel, in others cast steel, and in others Bessemer steel. It seems to be generally admitted that the durability of the steel in the head was in nowise impaired by its being placed upon a cushion or bed of wrought iron, but the great difficulty appeared to be in securing a thorough union or weld between the two kinds of metal. In the Austrian department at the exposition, where some admirable specimens of steel-headed rails were exhibited from the Newburg works the engineer in charge stated that nine per cent of the heads failed in the weld during the first year, but that subsequently no failure occurred, and that even with this amount of loss the rails were regarded as cheaper than either steel or iron.

Difficulty With the Weld.

At Crewe, where the works of the London and Northwestern Co. are situated, and where a considerable quantity of Bessemer steel-headed rails have been made, it was stated that some difficulty had been found at first in making a reliable weld of the steel to the wrought iron, and that as many as five per cent of the rails first made had failed in consequence of the loosening of the steel top; but as experience was acquired in the manufacture, this difficulty had disappeared, and the percentage of loss had been reduced materially.

The practice at Crewe is to place a bar of soft puddled iron between the steel of the top and the old rails used in the lower part of the rail, and as a further protection the steel for the head is rolled in the form of a channel bar, with ribs in the recessed portion, so as to fold around and embrace, as it were, the head of the rail.

In the United States.

Considerable experience has already been acquired in the United States as to the feasibility of making a sufficiently good junction between the iron and steel for a durable rail, and it may be confidently affirmed that there is no practical difficulty in the way of making an iron rail with a steel head, whether of puddled, Bessemer or cast metal, that will meet all the reasonable requirements of the case, and reduce the failures to less than one per cent. The cost of steel headed rails is, of course, intermediate between that of all iron and that of all old rails available for re-manufacture, and of thus renewing the tracks with a bearing surface of steel for gradual steps, and with a very moderate increase of cost. On the London and Northwestern railway, which has had the most experience in the use of Bessemer and steel-headed rails, experience seems to show that the steel-headed rails possess all the requirements in point of cost and durability for their general introduction on the line, and the conclusion is irresistible in my own mind, after a careful study of the specimens in the exposition, that the steel-headed rail will ultimately prevail over all other kinds of rails now known, and that in the United States the facilities for their manufacture are unusually favorable. It is a question in what manner the steel shall be made for the heads, and this point will be discussed when we come to speak of processes, and it is enough to state here that a good steel head can be made from any one of the kinds of steel above specified."

American Iron Rails Notorious.

Mr. Hewitt then takes up the subject of quality, in the cause of which discussion he says:

"In the Welsh iron works, it is notorious that the quality of the article produced is directly proportioned to the price paid for it, and in

my visits to those gigantic establishments which have grown up in the mountains of South Wales, it was humiliating to find that the vilest trash which could be dignified by the name of iron went universally by the name of the American rail. This is no fault of the Welsh iron-master, but has arisen from the almost universal practice of late years on the part of American railroad companies and contractors, of purchasing the lowest-priced article that could be produced. Of course no iron of this quality was to be found in the exposition; but if prizes were to be given for mere human ingenuity, I cannot conceive of anything more entitled to it than the production of a well-finished rail from puddled balls, that will not hold together under the alligator squeezer.

Cause of Railway Troubles.

There is, however, one thing more remarkable than this low quality of iron; and that is the stupidity and reckless extravagance of the customers who are found to buy it. To this cause, more than any other, is due the necessity of almost annual renewal of rails in the United States, and of the financial troubles of so many of our leading lines of railway; nor is there the slightest excuse for this result, for the Welsh iron-masters, to their credit be it said, make no concealment, either of the inferiority of the material or the poverty of the process by which it is treated, and generally prefer to turn out work creditable to themselves and profitable to their customers. But the inexorable law of competition, and the unremitted cry for cheap iron in America, have left them no choice.

Demand For Betterments.

For their own country, for the continent of Europe, and for India, no such system is practiced. As a general rule, all rails made for home consumption are guaranteed for from five to seven years, according to the traffic; that is to say, every rail that fails in the slightest degree within the time specified is renewed at the expense of the maker. The extra price paid for a guaranteed rail on roads of moderate traffic is about 30 per cent, but on roads having a heavy traffic at least 50 per cent additional is paid. In cases where the guarantee cannot be procured in consequence of the heavy usage to which the line, or any portion of it, is subjected, the conclusion is inevitable that a steel rail should be used. And until a similar system of guarantee and adequate payment therefor is introduced in the United States, shareholders in railway companies can place no reliance on the security of their investment and the permanency of dividends."

INSPECTION TRIP

Enjoyed By Pittsburg Railway Club as Guest of Steel Companies.

As the guests of the Carnegie Steel Co., and the National Tube Co., 275 members of the Railway Club of Pittsburg, their wives and friends were privileged with a tour of inspection of the principal plants of the companies in the Monongahela valley, Friday, Sept. 27.

Leaving the Pittsburg and Lake Erie station, Pittsburg, at 12:30 o'clock, the party proceeded by special train up the valley to Belle Vernon, Pa. Skirting the river bank the entire way, the impressive panorama of the community's great industrial activity was displayed to the party. While en route, a sumptuous luncheon prepared by the entertaining companies was served to the guests.

Arriving at Belle Vernon, the return trip to Pittsburg was begun. At McKeesport the first stop of the trip was made, and the guests, ably piloted by officials of the company, were conducted through the immense plant of the National Tube Co., viewing the interesting process of the manufacture of pipe in all its phases.

After spending over an hour in the great works, the journey was resumed to Bessemer where a similar opportunity was given the party to observe the operations of the Edgar Thomson Works of the Carnegie Steel Co., from the smelting of the iron ore in the blast furnaces, to the rolling of steel rails. On again boarding the special, the guests returned to Pittsburg, arriving in schedule time at 6 o'clock.

The trip throughout was characterized by a thorough preparation of detail and the large company of guests was handled in a very efficient style. This excellent management was due to the work of the committee in charge, consisting of L. C. Biehler, traffic manager of the Carnegie Steel Co., J. F. Townsend, traffic manager of the National Tube Co., J. B. Yohe, general manager of the Pittsburg & Lake Erie railroad and W. A. Terry, general freight agent of the same line.

At the Monongahela house, Pittsburg, Friday evening the Railway Club resumed its meetings for the fall and winter. The principal feature of the session was the discussion of "Vanadium Steel" by J. Kent Smith, chief metallurgist of the American Vanadium Co., Pittsburg. By the aid of the stereopticon views of micrographs of various steels, with and without the application of the vanadium, Mr. Smith presented a very interesting exposition of the value of the metal, with particular reference to locomotive and railroad materials. At the close of this talk, Mr. Smith answered and discussed practical questions relative to vanadium, as propounded by members of the club.

In the business session, preceding the paper of the evening, nominations of officers were presented. For the club's presidency, P. L. Kleine general car inspector of the Pennsylvania railroad, and H. W. Watts, master car builder with the Monongahela railroad, were named, the election to be held later and nominations were also made for the other officers. A vote of thanks was tendered the Carnegie Steel Co. and the National Tube Co., for their hospitality in entertaining the club and its friends on the inspection trip. A social hour concluded the session.

A Flywheel Completed in Record Time.—The C. & G. Cooper Co., Mt. Vernon, O., has completed in record time the installation of a large flywheel for the Youngstown Iron & Steel Roofing Co., Youngstown, O. The wheel was built to replace one which burst on Aug. 5. The old wheel had been in service a great many years, and with the engine was built in Providence. The order for the new flywheel was given on Aug. 9, with the understanding that it was to be shipped in 26 days. The wheel is 24 feet 8 inches diameter, and weighs 90,000 pounds. It was designed, cast, machined and shipped complete from the works of the Cooper company on Aug. 31, or in 18 working days. This anticipated the promised delivery about five days. It was delivered to the Youngstown company Sept. 1, and was erected and running by Sept. 3. The wheel is of the square rim type, made in halves, held together at the rim by double headed, countersunk tees of fagoted iron, and at the hub by four 4-inch bolts, and also double headed tees. The arms are oval shape, and 10 in number. The joints of the wheel are fitted with 3-inch tool steel dowels, which serve the double purpose of insuring a true joint and resisting any centrifugal strains by the shearing strength of the pins.

Steel Stock Slumps to a Lower Mark

A condition of mixed developments has swayed speculative sentiment in stocks and bonds during the past week. Unmistakable signs of a more healthy condition of the money market all over the world are apparent, and especially is the behavior of the American market a good one for this period of the year. Call money is comparatively cheap, and time money, though stiff, is not unobtainable, and is not being borrowed for purposes of stock speculation. Fund requirements for the moving of the crops from the interior have been readily met, due to the national treasury deposits. It is not to be hoped, however that all tightness will disappear, as commercial requirements are large generally. The unfavorable side of the week's ledger has been the slump in industrials conduced by the extreme weakness in copper. Twelve industrial stocks have made a new low record for the year, while the average price of 20 active railroads is now nearly four points below the figures of a week ago. United States Steel stocks, both common and preferred, have set new low records for the year, and this is attributable largely to the slump in Amalgamated Copper. Since Sept. 12 about 750,000 shares of United States Steel common, or more than 1-7 of that great issue, have changed hands at from 27 to 30. New York City bonds continue to attract investment buying. While the demand for bonds in general is not large, the call for the city securities is taken to indicate an available investment fund in the public's hands, which will be placed when conditions are satisfactory. The statement of the New York associated banks shows a loss from the surplus reserve of $2,758,525 by the operations in the past week. The surplus reserve now stands at $5,646,575, as against $12,540,350 Sept. 29, 1906. The actual reduction in cash holdings was $3,216,000, but the reserve requirement was lowered somewhat by the withdrawal of $1,829,900 in deposits. Against the decrease in deposits, loans were increased $2,772,500. The decrease in the surplus reserve was not liked by traders. Transactions on the New York exchange continue in small volume, sales of the week aggregating 2,357,150 shares, as against 2,337,400 shares last week and 6,927,400 shares the corresponding week of last year. The sales of bonds, exclusive of government bonds, aggregated $8,903,000, against $9,468,000 last week and $9,802,000 the same week of last year.

Copper Stocks.

Boston.—Butte Coalition, closed 15; Calumet & Arizona closed 106; Calumet & Hecla, closed 625; Green Cananea closed 8¾; North Butte Mining closed 45⅜; Osceola Mining closed 90; Quincy Mining closed 75½.

New York.—Amalagmated Copper closed 57½, net loss in week, 4¾.

bond interests, depreciations, etc., a surplus of $1,706,342 is shown in the operations of the company.

Recent dividend declarations include the following: Pullman Co., regular able Nov. 15; Westinghouse Electric & Mfg. Co., regular quarterly dividend of 2½ per cent quarterly dividend of 2 per cent, payon its preferred, assenting and non-assenting stocks, payable Oct.

THE LEADING INDUSTRIAL SECURITIES.

	Clos'ng Quo. Sept. 28	Changes in Week	Date 1907 Ann. M't'g	Stock Outstanding	Dividend Basis	Last Declared	Date Last Div. Pay.
Allis-Chalmers	7¼	— ¾	Sept. 5	19,820.000		.....	.....
Allis-Chalmers pr	20¼	—1¾		16,150.000	7 cum	1¾ Q.	Feb., 1904
American Can	4½	+ ¼	Feb. 7	41.233.300		.....	.....
Am. Can pr	48¾	— ¾		41,233,300	7 cum	1¾ Q.	July, 1907
Am. Car and Fdy	36½	—2½	June 27	30,000,000		1 Q.	July, 1907
Am. Car and Fdy pr	93	—1⅞		30,000,000	7 n. c.	1¾ Q.	July, 1907
American Loc.	50¼	—3¼	Oct. 5	25,000 000	5	1¼ Q.	Aug., 1907
American Loc. pr	99¼	—2¼		25,000,000	7 cum	1¾ Q.	July, 1907
American Ship	60¾	—1	Oct. 2	7.600.000	4	3	Sept., 1907
American Ship pr	103½	.....		7,900.000	7 n. c.	1¾ Q.	July, 1907
Am. Steel Foundries	6	—1¼	Oct. 1	15,810.000		.....	.....
Am. Steel Foundries pr	34	—5		17.240.000	6 cum	2½	Aug., 1904
Barney & Smith	65	.....	June 4	2,000,000	4	1 Q.	Sept., 1907
Barney & Smith pr	128½	.....		2,500 000	8 cum	2 Q.	Sept., 1907
Bethlehem Steel	14	+3½	April 2	14.862,000		.....	.....
Bethlehem Steel pr	32	.....		14,90×,000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	29¼	—1½	March 19	45,000,000*	6	1½ S. A.	Aug., 1907
Cambria Iron	44	.....		8,468.000*	4	2 S. A.	Apr., 1907
Chicago Pneumatic Tool	37½	.....	Feb. 18	6,145.800	4	1 Q.	Oct. 1907
Colorado Fuel	20¼	—2¾	Oct. 21	34.235.500		3½	Apr., 1902
Crucible Steel	63¾	— ¾	Oct. 16	24.578 400		.....	.....
Crucible Steel pr	62¼	—2¼		24,436 500	7 cum	1½ Q.	Oct., 1907
Empire Steel	9	.....	Feb. 27	2.281,400		.....	.....
Empire Steel pr	55	+5		2,500,000	6 cum	3 S. A.	July, 1906
Fay & Egan	100	.....	Feb. 19	1.000,000	6	1½ Q.	Aug., 1907
Fay & Egan pr	128¼	.....		1,000 000	7 cum	1¾ Q.	Aug., 1907
General Electric	126	—2	May 14	65.167.400	8	2 Q.	July, 1907
Harbison-Walker	15½	— ½	Jan. 21	18,000,000		½	Oct., 1907
Harbison-Walker pr	73	+1½		9,600,000	6 cum	1½ Q.	July, 1907
International Pump	20	.....	June 4	17,787,300		1	Apr., 1905
International Pump pr	70	+4		13,835,000	6 cum	1½ Q.	Aug., 1907
Lackawanna Steel	40	.....	March 13	34,971,400		.....	.....
Lake Sup. Corp	5	.....	Oct. 2	40,000,000		.....	.....
New York Air Brake	108½	—4½	June 18	10,000,000	8	2 Q.	July, 1907
Niles-Bement-Pond	130	.....	Feb. 6	5,000,000	6	1½ Q.	Dec., 1907
Niles-Bement-Pond pr	105	.....		2,000,000	6 cum	1½ Q.	Aug., 1907
Otis Elevator Co	70	.....	March 18	6,375 500		1½ S. A.	Oct., 1907
Otis Elevator Co. pr	75	—3		6,449.500	6 n. c.	1½ Q.	Oct,, 1907
Penn. Steel	63	.....	May 13	10,750.000		.....	.....
Penn. Steel pr	96	.....		16,500.000	7 n. c.	3½ S. A.	May, 1907
Pittsburg Coal Co	10⅜	+1⅛	Feb. 11	28 297.600		.....	Nov., 1906
Pittsburg Coal pr	50⅛	+1⅛		27,246,800	7 c.	3½	Apr , 1905
Pressed Stl. Car	28	—2½	Feb. 20	12.500,000		3	Aug., 1904
Pressed Stl. Car pr	84¼	+1¼		12.500 000	7 n. c.	1¾ Q.	Aug., 1907
Pullman	157½	— ½	Oct. 17	100,000 000	8	2 Q.	Aug., 1907
Railway Stl. Spring	35¾	+ ¼	March 7	13 500,000	4	2 S. A.	Nov., 1907
Railway Stl. Spring pr	81½	.....		13,500.000	7 cum	1¾ Q.	Sept., 1907
Rep. Iron & Steel	20	—1½	Oct. 16	27 191,000		.....	.....
Rep. Iron & Steel pr	74	.....		20,416 900	7 cum	1¾ Q.	Oct., 1907
Sloss-Sheffield	44	—4	March 5	10,000,000	5	1¼ Q.	Aug., 1907
Sloss-Sheffield pr	95	.....		6 700,000	7 n. c.	1¾ Q.	Oct., 1907
Tenn. Coal & Iron	135	.....	May 7	29,500 000	4	1 Q.	Aug., 1907
U. S. Pipe & Fdy	28½	—1½	June 26	12 500,000	4	1 Q.	Sept., 1907
U. S. Pipe & Fdy. pr	79	.....		12,500.000	7 n. c.	1¾ Q.	Sept., 1907
U. S. Steel	26⅝	—2⅛	April 15	508,302 500	2 n. c.	½ Q.	Sept., 1907
U. S. Steel pr	87⅞	—4⅝		360.281 100	7 cum	1¾ Q.	Aug., 1907
U. S. Steel 5's	94½	—1½		463 798 000	5	5 A.	.....
Va. Iron, Coal & Coke	58½	.....	Sept. 17	8.641.600		.....	.....
Westinghouse Elec	138	.....	J ly 24	24 998.700*	10	2½ Q.	Oct., 1907
Westinghouse Air Brake	154	—3½	Oct. 1	11,000,000*		5 Q	July, 1907

Par value of shares, $100, except those starred (*), $50

Financial Notes.

The directors of the Westinghouse Air Brake Co. have recommended an increase in the capital stock from $11,000,000 to $14,000,000 and the payment of a stock dividend of 25 per cent.

The Westinghouse Electric & Mfg. Co., for the five months ended Aug. 31, reports manufacturing profits of $2,491,100 and a total income of $3,548,887. After charging off all

15; Cutting Car Co., quarterly dividend of ½ per cent, payable Oct. 1; Westinghouse Air Brake Co., regular quarterly dividends of 2½ per cent and 2½ per cent extra; Crucible Steel Co. of America, regular quarterly dividend of 1½ per cent on the preferred stock, payable Oct. 1; New Haven Iron & Steel Co., dividend of 30 cents a share, or 6 per cent, payable Sept. 21; Chicago Pneumatic Tool Co., regular quarterly dividend of 1 per cent, payable Oct. 25.

NEWS FROM MANY INDUSTRIES

New Buyers:—

F. C. Mintzlaff and others have organized the Grafton Foundry Co., Grafton, Wis., with a capital of $9,000.

The Manufacturers' Ornamental Iron Works, Minneapolis, has been incorporated with a capital of $50,000 by E. P. Baker, H. L. Walton and E. A. Johnson.

The Bataille Pump & Machine Co., East Orange, N. J., capital $100,000, has been incorporated by John J. Bataille, R. Gertrude Bataille and Eugene F. Bataille.

The Milwaukee Machine Tool Co., Milwaukee, has been formed with an authorized capitalization of $20,000 by George Douglass, George A. Douglass and Emil M. Krueger.

The Gibson Gear & Mfg. Co., Springfield, Ill., has been incorporated by S. A. Gibson, Alpheus C. Gibson and George A. Gibson with a capital of $40,000.

The F. A. Austin Pattern Co., Syracuse, N. Y., has been chartered by Frank A. Austin, Allen C. Austin and Sarah Austin to design and manufacture patterns, models and machinery.

The Standard Foundry Co., Racine, Wis., has been formed with a capital of $15,000 by Knute Thompson, Albert Kousek, Henry Kousek and Richard Tilly.

The J. S. Austin Co., Racine, Wis., with a capital of $10,000 has been formed to manufacture hardware novelties by John S. Austin, Frank B. Austin and Anne B. Austin.

The Yieldable Gear Co., Springfield, O., has been chartered with an authorized capital of $10,000 by Charles E. Wade, T. H. Gannon, Martha Gannon, E. H. Sieler and F. M. Krapp.

Rohlffs & Buckley, Newark, N. J., have been chartered with a capital of $100,000 to manufacture wood and metal patterns, models and mill supplies by H. E. Rohlffs, J. E. Buckley and W. E. Turton.

The Nelson-Eccleston Mfg. Co., Nebraska City, Neb., has been incorporated by John A. Nelson, Frank B. Eccleston, Sam Nelson and A. P. Moran to manufacture and sell pump valves. The company is capitalized at $75,000.

John W. Cooper, Charles F. Filbrick, Willis M. Spaulding and others have organized the J. W. Cooper Co., Buffalo, N. Y., with a capital of $20,000. The new company will manufacture engines and machinery, railroad rails, etc.

W. F. Bossert Mfg. Co., Utica, N. Y., capital $50,000, has been formed by William F. Bossert, Hiram C. Williams, Charles G. Bennett and Leon W. Bossert. The company will manufacture railway, mechanical and electrical appliances.

Essex Brass Foundry Co., Amesbury, Mass., general foundry business, has been organized with a capital of $10,000. The officers of the company are: President and clerk, John Miller, Amesbury; treasurer, Charles W. Putnam, Amesbury.

The P. H. Fitzgibbons Boiler Co., Ogdensburg, N. Y., has been incorporated with $35,000 capital to manufacture engines, boilers and machinery. The incorporateors are P. H. Fitzgibbons, E. J. Dinneen, J. C. Howard and J. Hannan, all of Ogdensburg.

Wheelock Fence Co., Worcester, Mass., wire fences, etc., has been chartered with an authorized capital of $20,000. The officers of the company are: President, John H. Wheelock; treasurer, Paul L. Wheelock; clerk, Arthur E. Howard, all of Worcester.

The Weldless Chain Co., New York, has filed articles of incorporation to manufacture iron and steel chains with a capital of $15,000. Those interested are: Walter B. Lashar and Clark P. Lane Jr., Bridgeport, Conn., Christopher Reckleff, 26 Liberty street, New York.

The Crescent Marine Engineering Co., New York, has been organized with a capitalization of $50,000. The directors are James Caldin, 164 South Oxford street; Louise L. Bernier, 279 Carroll street, Brooklyn, and William S. Walsh, 242 West Seventy-third street, New York.

The Cook Iron Store Co., Rochester, N. Y., heavy hardware, manufacture iron and steel, capital $100,000, has been organized by Daniel L. Cook, 51 Brighton street; John N. Ibister, 22 Seventeenth street; Christopher F. Schminke, 57 Barrington street, all of Rochester.

Articles of incorporation have been filed by the Westchester Foundry Co., New Rochelle, N. Y., foundry, manufacturing tools, machinery, etc., with a capital of $40,000. Those interested are W. J. Jacobson, F. J. Holler, H. Benstem, New Rochelle, and W. L. Morgan, New York City.

The Universal Machine Co., Baltimore, has been formed by Christian Huff, James T. Carter, Harry Hoofnagle and Edwin Bond White, of Baltimore, and Edmund Coffe, of West Chester, Pa. The capital stock of the company is $25,000.

The Linton Machine Co., New York, has been organized to manufacture steam and electrical specialties. The capital stock of the company is $10,000, and the incorporators are Arthur B. Grotz, 486 Vanderbilt avenue; Frank L. Patterson, 256 Sterling place, and Howard Campbell Jr., 103 Clark street, all of Brooklyn.

Articles of incorporation have been filed by the Highland Falls Mfg. Co., Highland Falls, N. Y., to manufacture and cut gearing of brass and other metals. The capital stock of the company is $40,000, and the incorporators are George W. Blanchard, Wesley Blanchard, William C. Whitney, Frank G. Watrous, Highland Falls, N. Y., and Austin V. M. Sprague, 542 West Fifteenth street, New York.

New Construction:—

The Republic Iron & Steel Co. is improving its Hanna furnace at Youngstown, O., by the installation of a new stove 21 x 80 feet.

The Pawtucket Mfg. Co., Providence, R. I., is excavating for a new bolt shop 40 x 100 feet. The company manufactures bolts, nuts, etc.

The National Brake & Electric Co., Milwaukee, is planning the erection of a new steel foundry which will cost in the neighborhood of $100,000. The building will be of steel and brick 80 x 225 feet.

The steel frame work is under way for the erecting and machine shops of the B. & A. Railroad Co., at West Springfield, Mass. The main building is of brick and steel, 100 x 480 feet, with wings of 90 x 240 feet and 80 x 90 feet.

The Calumet Steel Co., Chicago, has awarded the contract to George H. Fuller, Chicago Heights, Ill., for two one-story engine houses, 35 x 60 feet each, and a one-story boiler house, 28 x 56 feet, to be built with composition roofs at Chicago Heights, Ill.

The Illinois Malleable Iron Co., 515 Diversey boulevard, Chicago, manufacture of pipe and castings, is about to build a foundry at 1562 North Paulina street. It will be two stories,

241 x 270 feet, of brick and mill construction.

The Harley Davidson Motor Co., Milwaukee, is enlarging its machine shop to double its present size, and in the future will confine itself almost entirely to the manufacture of motorcycles, motorcycle motors and motorcycle parts. The company expects to turn out from 400 to 500 machines this season. No machinery will be added at present, except possibly a turret lathe or screw machine.

The Canton Drop Forging & Mfg. Co., Canton, O., has purchased a tract of land 70 x 125 feet immediately adjoining its present plant, and the construction of extensions, greatly increasing the company's output, are in contemplation. The company has been experiencing a very healthy growth in the volume of its business, and the need of increased capacity has resulted in the decision to add to the capital outlay in the way of plant additions.

The McClintic-Marshall Construction Co. has been awarded the general contract for the reconstruction of two car shops, each 80 x 500 feet, and a one-story machine shop, 32 x 162 feet, at 5165 South St. Louis avenue, Chicago, for the Chicago, New York & Boston Refrigerator Co., 618 First National Bank building. The original shops were destroyed by fire July 30. The new buildings will be of brick, steel and corrugated iron.

A controlling interest in Taplin, Rice & Co., Akron, O. manufacturers of stoves, clay machinery, etc., has been purchased by Wm. Clerkin and the company will hereafter be known as the Taplin-Rice-Clerkin Co., capitalized at $250,000. It is the intention of the reorganized company to tear down a considerable portion of the old plant and to erect two large fire-proof structures, which will be devoted to foundry and machine shop purposes, thereby trebling the present capacity. To the present lines of manufacture will be added heating furnaces and boilers. The Taplin-Rice Co. was organized in 1866 and has had an honored and successful business history. Mr. Clerkin, the new member of the company, recently disposed of his interests in the XXth Century Heating & Ventilating Co., manufacturer of furnaces.

The Lexington Machine Works, Lexington, Tenn., recently incorporated, will manufacture a patent adjustable pitman connection for harvesting machinery, which it is claimed possesses advantages over other connections now on the market. The incorporation step was taken to promote the business which had outgrown the company's capacity. A two-story brick building 36 x 60 feet has been acquired for a machine shop and an addition 36 x 50 feet will probably be erected for a foundry. The company is in the market for lathes, planers, drill press, power hack saw, sheet metal stamping press, foundry equipment, cranes, etc. The company is also planning to carry a stock of mill supplies. F. A. Lancaster is president; W. T. Watson, vice president, H. E. Graper, treasurer and E. Jones, general manager.

The recent incorporation of the Morris Engineering Co., Philadelphia, was done to take over the business of P. H. & A. S. Morris, consulting and contracting engineers and machinists. A fire having completely destroyed the old works in June it was deemed advisable to move from the old location to a property possessing better railroad facilities. With this end in view the company has purchased the machine shops at Thirty-seventh and Reed streets, formerly operated by the Philadelphia Rubber Works. This shop was in operation about two years and is equipped primarily for the manufacture of rubber reclaiming machinery. It contains the necessary equipment of chilled rolled lathes, grinders and corrugating machines in addition to standard machine tools. The Morris company is adding an extension of 100 feet to the building and will install a 10 x 16 foot Betts mill, open side planer, several radial drills and a number of smaller machine tools, all of which are either at hand or contracted for. The company will continue the manufacture of sugar machinery and sand-lime-brick machinery in addition to special work.

General Industrial Notes.—

The Champion Iron Co., Kenton, O., has increased its capital stock from $150,000 to $500,000.

The annual meeting of the stockholders of the Colorado Fuel & Iron Co. will be held Oct. 21 at Denver, Colo.

The new steel casting plant of the Bonney-Floyd Co., Columbus, O., has been placed in operation and very satisfactory results are being obtained. The capacity of the plant is about 20 tons daily.

Jno. H. Cowles & Co., have purchased the business of Haight & Co., Louisville, Ky., and, as in the past, will continue to do plating, polishing and lacquering and brass work. The business will be continued at the old location, 544 Fifth street.

The Hayden-Corbett Chain Co., Columbus, which has been operating under a West Virginia charter, has incorporated under Ohio laws, with a capital of $250,000. John W. Dages, J. D. Price, W. H. Andrews, W. C. Brown, W. C. Orr, J. T. Corbett and Frank L. Packard are named as the incorporators.

The Marceline Steel Co., incorporated some months ago, is now located at 20 Vesey street, New York. Its specialty is a high speed tool steel, of British make, for which is claimed a considerably lower hardening temperature than has been obtained heretofore. Its toughness in structure makes it desirable for all formed tools and it possesses a softness of all shapes which would be made into milling cutters, drills, etc., with a corresponding saving in the cost of manufacture. The stock, as furnished, can be readily cut with a cold chisel and can be hardened equally well by air, in oil or by air blast.

At the meeting of the directors of the Youngstown Sheet & Tube Co., Youngstown, O., officers were elected for the ensuing year as follows. President, James A. Campbell; first vice president, H. G. Dalton; second vice president and general manager, C. S. Robinson; treasurer, Robert Garlick; secretary, Geo. E. Day; auditor, W. B. Jones.

Another postponement has been made in the time of holding the annual meeting of the Allis-Chalmers Co. It is now proposed to hold the session at Jersey City, N. J, Oct. 24.

At the annual meeting of the Tidewater Steel Co., Chester, Pa., the following directors were re-elected for the ensuing year: Evans R. Dick, J. Howard Moody, Joseph Gilfillan, George McCall, Charles A. Porter, Charles T. Schoen, Frank Samuel, Charles E. Stafford and Frederick S. Hovey. President Charles E. Stafford and secretary and treasurer, Frank Dreizler, of New York, were re-elected to these offices.

The Rivetless Chain & Engineering Co., Lebanon, Pa., has been organized to erect a plant in that city for the manufacture of rivetless chains. A spacious site has already been purchased. The officers of the new corporation are as follows: President, Isaac Crist, Tamaqua, Pa.; vice president, Jacob M Millard; secretary, H. U. Spessard, Chambersburg, Pa., and treasurer, Edwin H. Molly, Lebanon. The board of directors comprises Dr.

A. J. Riegel, Edwin H. Molly, Robert L. Eby, Jacob B. Millard, Thomas Evans, William P. Coldren, Lebanon; S. C. Riley, New Haven, Conn.; Isaac Crist, Tamaqua, Pa., and J. H. Burgh, Allentown.

The Sterling Machine & Stamping Co., Vermillion, O., recently organized, has acquired the plant of the Duplex Stamping Co., of that place, and will manufacture gas and gasoline engines for stationary and marine purposes. The engine is of special design and calculated in size to meet the requirements for which it is planned. In addition to the engines, the company will manufacture a line of builders' hardware and sundry specialties, and is also well equipped for producing special machinery, dies, special tools and models. A complete plating equipment is possessed by the company. At present no additional building or buying of any machinery is contemplated.

Trade Notes:—

A fine vein of molding sand has just been opened by the Mercer County Velvet Sand Co., near Greenville, Pa. The Bessemer Foundry Co., Grove City, Pa., will handle the sand for the trade.

The Cincinnati Electrical Tool Co. announces the opening of a western office and warehouse for the sale of its electric tools at Eighteenth and Rockwell streets, Chicago, with Oscar P. Wodack as manager.

P. J. Brown, contractor, Cleveland, has removed to new offices at 414 New England building. Mr. Brown makes a specialty of blast furnace and rolling mill brick work and has just closed a contract with the Upson Nut Co. to build a new stove at the furnace plant recently taken possession of by the company from Corrigan-McKinney & Co., who had been operating it under lease.

The new power stations of the North Shore Electric Co., at Waukegan and Blue Island, near Chicago, have been furnished with alternating current electric Northern cranes, supplied by the Northern Engineering Works, Detroit. These cranes are of 30 and 25 tons capacity and 58 and 39 feet span respectively. The larger crane is equipped with an auxiliary high speed alternating current hoist. Among other recent installations furnished by the Northern works are an eight-ton 32-foot span crane for the Black Hills Traction Co., Spearfish, S. D.; a No. 336 Newton patent cupola for the Miller Foundry & Specialty Co., North Tonawanda, N. Y., and a Newton patent cupola with a capacity of approximately 16 tons per hour for the Berlin Machine Works, Beloit, Wis. A cupola of the same make will also be installed in the latter company's Canadian plant at Hamilton, Ont.

The Bruce-Meriam-Abbott Co., Cleveland, reports that in the past six weeks it has taken the following orders for its vertical twin cylinder gas engines: The Willard Storage Battery Co., Cleveland, two 80 horsepower natural gas engines; C. F. Smith, Pittsburg, one 100 horsepower natural gas engine; the Homestead Heater & Mfg. Co., Homestead, Pa., one 12 horsepower natural gas engine; Charles Flaccus, Sharpsburg, Pa., one 18 horsepowen gasoline engine; the Iowa State University, Iowa City, Iowa, one 27 horsepower artificial gas engine; the Wheats Ice Cream Co., Buffalo, one 100 horsepower natural gas engine; the Astrup Mfg. Co., Cleveland, one 35 horsepower natural gas engine; the J. P. Eustis Mfg. Co., Boston, one 55 horsepower producer gas engine and 150 horsepower Wile gas producer; the J. W. Walace Co., New York two 65 horsepower producer gas engines and 150 horsepower Wile Gas producer; the F. M. Roberts Co., Pittsburg, one 55 horsepower natural gas engine, and the Dayton Motor Car Co., Chicago, Ill., one 55 horsepower natural gas engine. The current reports of the falling off in the demand for some lines of manufacture do not apply to the Bruce-Meriam-Abbott Co., as more business inquiries than ever before are being received by the company.

Fires:—

The iron foundry of William R. Martin, Lancaster, Pa., suffered a fire loss estimated at $3,500, Sept. 18.

The foundry of J. A. Pement & Co., 3146 Wentworth avenue, Chicago, sustained a loss by fire Sept. 20, following an explosion of gasoline.

The foundry of John Elliott, Northfield, Minn., was heavily damaged by fire Sept. 19. The plant was held under lease by the Miracle Pressed Stone Co., of Minneapolis, under lease.

A notice was posted Sept. 20 at the sheet steel mill of the American Sheet & Tin Plate Co., Sharon, Pa., of an increase in wages for all tonnage men of 2 per cent. The increase dates from Sept. 1 and about 300 men are benefitted.

TRADE PUBLICATIONS.

Coal Mining Machinery.—The Ingersoll-Rand Co., New York, has issued a 24-page booklet giving a variety of information concerning various machines for coal mining manufactured by that company.

Switchboard Apparatus.—The Dayton Electrical Mfg. Co., Dayton, O., has issued Bulletin No. 7, describing a switchboard gas engine ignition outfit consisting of a switchboard and two storage batteries. It is designed for use with stationary gas engines, which are used to drive direct-current lighting and power dynamos. The bulletin comprises four 6 x 9-inch pages.

Steam Turbines.—The Curtis steam turbine generator is described in pamphlet 3531, issued by the General Electric Co., Schenectady, N. Y. It is a publication of 29 8 x 11-inch pages. This pamphlet gives considerable information in regard to superheat, vacuum, economy, etc., and the details of construction and pattern of all parts of the Curtis apparatus. It also presents detailed tests of turbines of various sizes showing high efficiencies. The pamphlet is printed in an extremely attractive fashion and the illustrations are exceptionally fine.

Oil Engines.—The De La Vergne Machine Co., New York, is distributing a folder describing the De La Vergne vertical oil engine recently placed on the market. This engine is especially designed for the use of cheap oils—kerosene or fuel oil. At present, 7½- and 15-horsepower engines are built, other sizes being under construction.

Machine Keys and Specialties.—The Standard Gauge Steel Co., Beaver Falls, Pa., has just published a catalog describing finished machine keys, finished machine racks, elevator guides, couplings, screws, worms and other machine specialties. The book is 4¼ x 6½ inches and contains 109 pages. It presents illustrations, specifications and prices of various types of keys, gibs, etc., machine racks, etc. In addition, it contains useful information in regard to wire gages, power transmitted by gearing and belting, tables of capacities of cisterns, tanks, pumps, tables of circles, dimensions of tubes, screw threads, etc., together with other information.

Forgings. — The Crucible Steel Forge Co., Cleveland, has published a catalog describing and illustrating a large line of die forgings, rings and special forgings manufactured by it. These include bicycle forgings, engine forgings, crank shafts, etc. The catalog comprises 32 10 x 5 pages.